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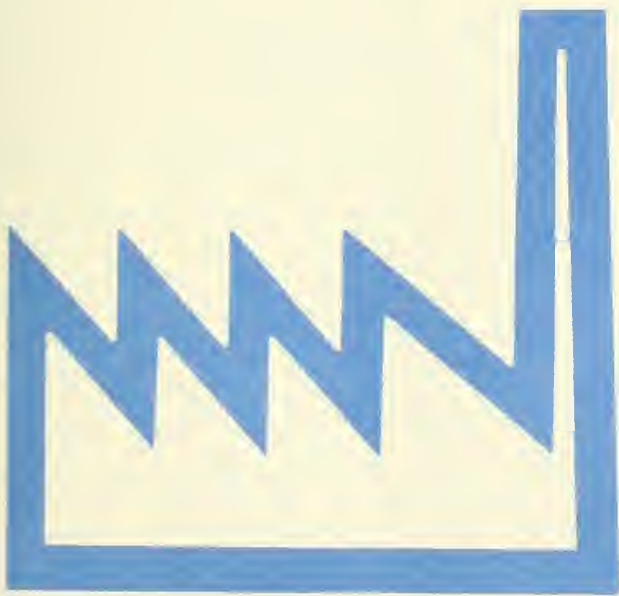
Census of Manufactures

MC87-I-28A

INDUSTRY SERIES

Industrial Inorganic Chemicals

Industries 2812, 2813, 2816, and 2819



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The overall planning and review of the census operations were performed by the staff of the Office of the Assistant Director for Economic and Agriculture Censuses.

This report was prepared in the Industry Division. **John Govoni**, Assistant Chief for Census/ASM Programs, was responsible for the overall planning, management, and coordination of the census of manufactures. Planning and implementation were under the direction of **Michael J. Zampogna**, Chief, Nondurables Branch, assisted by **Allen H. Foreman, Jr.**, Section Chief, with primary data analysis responsibilities performed by **Andrew W. Hait**.

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If you have any questions concerning the statistics in this report, call (301) 763-2510.

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INTRODUCTION

PURPOSE AND USES OF THE ECONOMIC CENSUSES

The economic censuses are the major source of facts about the structure and functioning of the Nation's economy. They provide essential information for government, business, industry, and the general public.

Economic censuses furnish an important part of the framework for such composite measures as the gross national product, input-output measures, production and price indexes, and other statistical series that measure short-term changes in economic conditions.

Policy-making agencies of the Federal Government use the data, especially in monitoring economic activity and providing assistance to business.

State and local governments use the data to assess business activities and tax bases within their jurisdictions and to develop programs to attract business.

Trade associations study trends in their own and competing industries, and keep their members informed of market changes.

Individual businesses use the data to locate potential markets and to analyze their own production and sales performance relative to industry or area averages.

AUTHORITY AND SCOPE

Title 13 of the United States Code (sections 131, 191, and 224) directs the Census Bureau to take the economic censuses every 5 years, covering years ending in 2 and 7. The 1987 Economic Censuses consist of the

- Census of Retail Trade
- Census of Wholesale Trade
- Census of Service Industries
- Census of Transportation
- Census of Manufactures
- Census of Mineral Industries
- Census of Construction Industries

Special programs also cover enterprise statistics and minority-owned and women-owned businesses. (The 1987 Census of Agriculture and 1987 Census of Governments are conducted separately.) The next economic censuses are scheduled to be taken in 1993 covering the year 1992.

AVAILABILITY OF THE DATA

The results of each of the economic censuses are available in printed reports, for sale by the U.S. Government Printing Office, and on microfiche, computer tape, compact discs with read-only memory, and flexible diskettes, for sale by the Census Bureau. Order forms for all types of products are available on request from Customer Services, Census Bureau, Washington, DC 20233. A more complete description of publications being issued from this census is on the inside back cover of this document.

Census facts are also widely disseminated by trade associations, business journals, and newspapers. Volumes containing census statistics are available in most major public and college libraries. Finally, State Data Centers in every State and Business and Industry Data Centers in many States also supply economic census statistics.

WHAT'S NEW IN 1987

Several changes have taken place for the 1987 censuses. Data will be reported on the basis of the newly revised Standard Industrial Classification (SIC) system with selected reports including "bridge tables," linking the old and new classification systems. A new set of metropolitan areas has been adopted, and more detailed information will be available for businesses with no paid employees. For additional information on these changes, review the subsequent text.

HISTORICAL INFORMATION

The economic censuses have been taken together as an integrated program at 5-year intervals since 1967, and before that for 1963, 1958, and 1954. Prior to that time, the individual censuses were taken separately at varying intervals.

The economic censuses trace their beginnings to the 1810 Decennial Census, when questions on manufacturing were included with those for population. Coverage of economic activities was expanded for 1840 and subsequent censuses to include mining and some commercial

activities. In 1902, Congress established a permanent Census Bureau and directed that a census of manufactures be taken every 5 years. The 1905 manufactures census was the first time a census was taken apart from the regular every-10-year population census.

The first census of business was taken in 1930, covering 1929. Initially it covered retail and wholesale trade, and construction industries, but it was broadened in 1933 to include some of the service trades.

The 1954 economic censuses were the first to be fully integrated—providing comparable census data across economic sectors, using consistent time periods, concepts, definitions, classifications, and reporting units. These were the first censuses to be taken by mail, using lists of firms provided by the administrative records of other federal agencies. Since 1963, administrative records have also been used to provide basic statistics as well for very small firms, reducing or eliminating the need to send them census questionnaires. The Enterprise Statistics Program, which publishes combined data from the economic censuses, was made possible with the implementation of the integrated census program in 1954.

The range of industries covered in the economic censuses has continued to expand. The Census of Construction Industries began on a regular basis in 1967, and the scope of service industries was broadened in 1967, 1977, and 1987. The Census of Transportation began in 1963 as a set of surveys covering travel, transportation of commodities, and trucks. New for 1987 are publications reporting on business establishments engaged in several transportation industries, paralleling the data on establishments in other sectors. This is part of a gradual expansion in coverage of industries previously subjected to government regulation. The Survey of Minority-Owned Business Enterprises was first conducted as a special project in 1969 and was incorporated into the economic censuses in 1972 along with the Survey of Women-Owned Businesses.

Economic censuses have also been taken in Puerto Rico since 1909, in the Virgin Islands and Guam since 1958, and in the Northern Mariana Islands since 1982.

Statistical reports from the 1982 and earlier censuses provide historical figures for the study of long-term time series, and are available in some large libraries. All of the census data published since 1967 are still available for sale on microfiche from the Census Bureau.

AVAILABILITY OF MORE FREQUENT ECONOMIC DATA

While the censuses provide complete enumerations every 5 years, there are many needs for more frequent data as well. The Census Bureau conducts a number of monthly, quarterly, and annual surveys, the results of which appear in publication series such as *Current Business Reports* (retail and wholesale trade and service industries), the *Annual Survey of Manufactures*, *Current Industrial Reports*, and the *Quarterly Financial Report*. Most of these surveys, while providing more frequent

observations, yield less kind-of-business and geographic detail than the censuses. The *County Business Patterns* program offers annual statistics on the number of establishments, employment, and payroll classified by industry within each county.

SOURCES FOR MORE INFORMATION

More information about the scope, coverage, classification system, data items, and publications for each of the economic censuses and related surveys is published in the *Guide to the 1987 Economic Censuses and Related Statistics*. More information on the methodology, procedures, and history of the censuses will be published in the *History of the 1987 Economic Censuses*. Contact Customer Services for information on availability.

CENSUS OF MANUFACTURES

General

This report, from the 1987 Census of Manufactures, is one of a series of 83 industry reports, each of which provides statistics for individual industries or groups of related industries. Additional separate reports will be issued for each State and the District of Columbia and for special subjects such as type of organization, distribution of sales by class of customer, concentration ratios and water use in manufacturing.

The industry reports include such statistics as number of establishments, employment, payroll, value added by manufacture, cost of materials consumed, capital expenditures, product shipments, etc.

State reports present similar statistics for each State and its important metropolitan statistical areas (MSA's), counties, and places. Selected statistical totals for "all manufacturing" have been shown in the State reports for MSA's with 250 employees or more and for counties and places with 450 employees or more.

The *General Summary* report will contain industry, product class, and geographic area statistics summarized in one report. The introduction to the *General Summary* discusses, at greater length, many of the subjects described in this introduction. For example, the *General Summary* text will discuss the relationship of value added by manufacture to National income by industry of origin, the changes in statistical concepts over the history of the censuses, and the valuation problems arising from intracompany transfers between manufacturing plants of a company and between manufacturing plants and sales offices and sales branches of a company.

Scope of Census and Definition of Manufacturing

The 1987 Census of Manufactures covers all establishments with one paid employee or more primarily engaged in manufacturing as defined in the *1987 Standard Industrial*

*Classification (SIC) Manual*¹. This is the system of industrial classification developed by experts on classification in Government and private industry under the guidance of the Office of Information and Regulatory Affairs, Office of Management and Budget. This classification system is used by Government agencies as well as many organizations outside the Government.

The SIC Manual defines manufacturing as the mechanical or chemical transformation of substances or materials into new products. The assembly of component parts of products also is considered to be manufacturing if the resulting product is neither a structure nor other fixed improvement. These activities are usually carried on in plants, factories, or mills that characteristically use power-driven machines and materials-handling equipment.

Manufacturing production is usually carried on for the wholesale market, for transfers to other plants of the same company, or to the order of industrial users rather than for direct sale to the household consumer. Some manufacturers in a few industries sell chiefly at retail to household consumers through the mail, through house-to-house routes, or through salespersons. Some activities of a service nature (enameling, engraving, etc.) are included in manufacturing when they are performed primarily for trade. They are considered nonmanufacturing when they are performed primarily to the order of the household consumer.

Relationship Between Annual Survey of Manufactures and Census of Manufactures

The Bureau of the Census conducts the annual survey of manufactures (ASM) in each of the 4 years between the censuses of manufactures. The ASM is a probability-based sample of approximately 56,000 establishments and collects the same industry statistics (employment, payroll, value of shipments, etc.) as the census of manufactures. In addition to collecting the information normally requested on the census form, the establishments in the ASM sample are requested to supply information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, costs of purchased services, and foreign content of materials consumed. Except for supplemental labor costs, the extra ASM items are collected only in census years.

Establishment Basis of Reporting

The census of manufactures is conducted on an establishment basis. A company operating at more than one location is required to file a separate report for each location. The ASM also is conducted on an establishment basis, but separate reports are filed for just those establishments selected in the sample. Companies engaged in

distinctly different lines of activity at one location are requested to submit separate reports if the plant records permit such a separation and if the activities are substantial in size.

In 1987, as in earlier years, a minimum size limit was set for inclusion of establishments in the census. All establishments employing one person or more at any time during the census year are included. The same size limitation has applied since 1947 in censuses and annual surveys of manufactures. In the 1939 and earlier censuses, establishments with less than \$5,000 value of products were excluded. The change in the minimum size limit in 1947 does not appreciably affect the historical comparability of the census figures except for data on number of establishments for a few industries. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units that service manufacturing establishments of the same company (see Auxiliaries).

Manufacturing Universe and Census Report Forms

The 1987 Census of Manufactures universe includes approximately 350,000 establishments. The amounts of information requested from manufacturing establishments were dependent upon a number of factors. The more important considerations were the size of the company and whether it was included in the annual survey of manufactures. The methods of obtaining information for the various subsets of the universe to arrive at the aggregate figures shown in the publication are described below:

1. Small Single-Establishment Companies Not Sent a Report Form

In the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of these small establishments was done on an industry-by-industry basis and was based on annual payroll and total shipments data as well as on the industry classification codes contained in the administrative records of Federal agencies. The cutoffs were selected so that these administrative-records cases would account for no more than 3 percent of the value of shipments for all manufacturing. Generally, all single-establishment companies with less than five employees were excused, while all establishments with more than 20 employees were mailed forms.

Information on the physical location of the establishment, as well as information on payrolls, receipts (shipments), and industry classification, was obtained from the administrative records of other Federal agencies under special arrangements, which safeguarded their confidentiality. Estimates of data for these small establishments were developed using industry averages in conjunction with the administrative information. The value of shipments and cost of materials

¹Standard Industrial Classification Manual: 1987: For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Stock No. 041-001-00314-2.

were not distributed among specific products and materials for these establishments but were included in the product and material "not specified by kind" (n.s.k.) categories.

The industry classification codes included in the administrative-records files were assigned on the basis of brief descriptions of the general activity of the establishment. As a result, an indeterminate number of establishments were erroneously coded at the four-digit SIC level. This was especially true whenever there was a relatively fine line of demarcation between industries or between manufacturing and nonmanufacturing activity.

Sometimes these administrative-record cases were only given a two- or three-digit SIC group. For the 1987 Census of Manufactures, these establishments were sent a separate classification form, which requested information on the products and services of the establishment. This form was used to code many of these establishments to the four-digit SIC level. Establishments that did not return the classification form were coded later to those four-digit SIC industries identified as "not elsewhere classified" (n.e.c.) within the given two- or three-digit industry groups.

As a result of these situations, a number of small establishments may have been misclassified by industry. However, such possible misclassification has no significant effect on the statistics other than on the number of companies and establishments.

The total establishment count for individual industries should be viewed as an approximation rather than a precise measurement. The counts for establishments with 20 employees or more are far more reliable than the count of total number of establishments.

2. Establishments Sent a Report Form

The 200,000 establishments covered in the mail canvass were divided into three groups:

- a. **ASM sample establishments**—This group consisted of approximately 56,000 establishments covering all the units of large manufacturing establishments as well as a sample of the medium and smaller establishments. The probability of selection was proportionate to size (see appendix, Annual Survey of Manufactures).

In a census of manufactures year, the ASM report form (MA-1000) replaces the first page of the regular census form for those establishments included in the ASM. In addition to information on employment, payroll, and other items normally requested on the regular census form, establishments in the ASM sample were requested to supply information on assets, capital expenditures, retirements, depreciation, rental payments, supplemental labor costs, and costs of purchased services. See appendix A, section 2, for an explanation of these items.

The census part of the report form is one of approximately 200 versions containing product, material, and special inquiries. The diversity of manufacturing activities necessitated the use of these many forms to canvass the 459 manufacturing industries. Each form was developed for a group of related industries.

Appearing on each form was a list of products primary to the group of related industries as well as secondary products and miscellaneous services that establishments classified in these industries were likely to be performing. Respondents were requested to identify the products, the value of each product, and, in a large number of cases, the quantity of the product shipped during the survey year. Space also was provided for the respondent to describe products not specifically identified on the form.

The report form also contained a materials-consumed inquiry, which varied from form to form depending on the industries being canvassed. The respondents were asked to review a list of materials generally used in their production processes. From this list, each establishment was requested to identify those materials consumed during the survey year, the cost of each, and, in certain cases, the quantity consumed. Once again, space was provided for the respondent to describe significant material not identified on the form.

Finally, a wide variety of special inquiries was included to measure activities peculiar to a given industry, such as operations performed and equipment used.

- b. **Large and medium establishments (non-ASM)**—Approximately 84,000 establishments were included in this group. A variable cutoff, based on administrative-records payroll data and determined on an industry-by-industry basis, was used to select those establishments that were to receive one of the approximately 200 census of manufactures regular forms. The first page, requesting establishment data for items such as employment and payroll, was standard but did not contain the detailed statistics included on the ASM form. The product, material, and special inquiry sections supplied were based on the historical industry classification of the establishment.
- c. **Small single-establishment companies (non-ASM)**—This group consisted of approximately 60,000 establishments. For those industries where application of the variable cutoff for administrative-records cases resulted in a large number of small establishments being included in the mail canvass, an abbreviated or "short" form was used. These establishments received one of the approximately 80 versions of the short form, which requested

summary product and material data and totals but no details on employment, payrolls, cost of materials, inventories, and capital expenditures.

Use of the short form has no adverse effect on published totals for the industry statistics; the same data were collected on the short form as on the long form. However, detailed information on materials consumed was not collected on the short form; thus its use would increase the value of the n.s.k. categories.

Auxiliaries

In this industry report, the data on employment and payroll are limited to operating manufacturing establishments. The census report form filed for auxiliaries (ES-9200) requested a description of the activity of the establishments serviced. However, the manufacturing auxiliaries were coded only to the two-digit major group of the establishments they served; whereas, the operating establishments were coded to a four-digit manufacturing industry. Data for the approximately 10,000 separately operated auxiliaries are included in the geographic area series and in a report issued as part of the 1987 Enterprise Statistics Survey.

Auxiliaries are establishments whose employees are primarily engaged in performing supporting services for other establishments of the same company, rather than for the general public or for other business firms. They can be at different locations from the establishments served or at the same location as one of those establishments but not operating as an integral part thereof and serving two establishments or more. Where auxiliary operations are conducted at the same location as the manufacturing operation and operate as an integral part thereof, they usually are included in the report for the operating manufacturing establishment.

Included in the broad category of auxiliaries are administrative offices. Employees in administrative offices are concerned with the general management of multiestablishment companies, i.e., with the general supervision and control of two units or more, such as manufacturing plants, mines, sales branches, or stores. The functions of these employees may include (1) program planning, including sales research and coordination of purchasing, production, and distribution; (2) company purchasing, including general contracts and purchasing methods; (3) company financial policy and accounting; (4) general engineering, including design of product machinery and equipment, and direction of engineering effort conducted at the individual operation locations; (5) direction of company personnel matters; and (6) legal and patent matters.

Other types of auxiliaries serving the plants or central management of the company include purchasing offices, sales promotion offices, research and development organizations, etc.

Industry Classification of Establishments

Each of the establishments covered in the census was classified in 1 of 459 manufacturing industries in accordance with the industry definitions in the 1987 SIC Manual. The 1987 edition of this manual represents a major revision for manufacturing industries from the 1972 edition and its 1977 supplement. Appendix A of the 1987 Manual notes the revisions in the four-digit industry levels between 1972/77 and 1987.

An industry is generally defined as a group of establishments producing the same product or a closely related group of products. The product groupings from which industry classifications are derived are based on considerations such as similarity of manufacturing processes, types of materials used, types of customers, and the like. The resulting group of establishments must be significant in terms of number, value added by manufacture, value of shipments, and number of employees. The system operates in such a way that the definitions progressively become narrower with successive additions of numerical digits. For 1987, there are 20 major groups (two-digit SIC), 139 industry groups (three-digit SIC), and 459 industries (four-digit SIC). This represents an expansion of four-digit industries from 452 in 1972/77 and a reduction of three-digit groups from 143 in 1972/77. Product classes and products of the manufacturing industries have been assigned codes based on the industry from which they originate. There are about 11,000 products identified by a seven-digit code. The seven-digit products are considered the primary products of the industry with the same four digits.

Accordingly, an establishment is usually classified in a particular industry on the basis of its major activity during a particular year, i.e., production of the products primary to that industry exceeds, in value, production of the products primary to any other single industry. In a few instances, however, the industry classification of an establishment is not only determined by the products it makes but also by the process employed in operations. Refining of nonferrous metals from ore or rolling and drawing of nonferrous metals (processes which involve heavy capitalization in specialized equipment) would be classified according to the process used during a census year. These establishments then would be "frozen" in that industry during the following ASM years.

In either a census or ASM year, establishments included in the ASM sample with certainty weight, other than those involved with heavily capitalized activities described above, are reclassified by industry only if the change in the primary activity from the prior year is significant or the change has occurred for 2 successive years. This procedure prevents reclassification when there are minor shifts in product mix.

In ASM years, establishments included in the ASM sample with noncertainty weight are not shifted from one industry classification to another. They are retained in the industry where they were classified in the base census year (see appendix, Annual Survey of Manufactures).

However, in the following census year, these ASM plants are allowed to shift from one industry to another.

The result of these rules covering the switching of plants from one industry classification to another is that, at the aggregate level, some industries comprise different mixes of establishments between survey years, and establishment data for such industry statistics as employment and payroll may be tabulated in different industries between survey years. Hence, comparisons between prior-year and current-year published totals, particularly at the four-digit SIC level, should be viewed with caution. This is particularly true for the comparison between the data shown for a census year versus the data shown for the previous ASM year.

As previously noted, the small establishments that may have been misclassified by industry are usually administrative-record cases whose industry codes were assigned on the basis of incomplete descriptions of the general activity of the establishment. Such possible misclassifications have no significant effect on the statistics other than on the number of companies and establishments.

While some establishments produce only the primary products of the industry in which they are classified, all establishments of an industry rarely specialize to this extent. The industry statistics (employment, inventories, value added by manufacture, total value of shipments including resales and miscellaneous receipts, etc.) shown in tables 1a through 5a, therefore, reflect not only the primary activities of the establishments in that industry but also their secondary activities. The product statistics in table 6a represent the output of all establishments whether or not they are classified in the same industry as the product. For this reason, in relating the industry statistics, especially the value of shipments to the product statistics, the composition of the industry's output shown in table 5b should be considered.

The extent to which industry and product statistics may be matched with each other is measured by two ratios which are computed from the figures shown in table 5b. The first of these ratios, called the primary product specialization ratio, measures the proportion of product shipments (both primary and secondary) of the establishments classified in the industry represented by the primary products of those establishments. The second ratio, called the coverage ratio, is the proportion of primary products shipped by the establishments classified in the industry to total shipments of such products by all manufacturing establishments.

However, establishments making products falling into the same industry category may use a variety of processes and materials to produce them. Also, the same industry classification (based on end products) may include both establishments that are highly integrated and those that put only the finishing touches on an already highly fabricated item. For example, the refrigeration equipment industry includes instances of almost complete integration (production of the compressor, condensing unit, electric motor, casting, stamping of the case, and final assembly) all

carried on at one plant. On the other hand, the condensing unit, the motor, and the case may be purchased and only assembled into the finished product.

In some instances, separate industry categories have been established for integrated and nonintegrated establishments. For other industries, the census provides separate statistics on the production of intermediate commodities made and used in the producing plant. For some industries characterized by many plants of the same company, separate figures on interplant transfers of products usually are shown.

Differences in the integration of production processes, types of operations, and alternatives in types of materials used should be considered when relating the industry statistics (employment, payrolls, value added, etc.) to the product and material data.

Value of Shipments for the Industry Compared With Value of Product Shipments

This report shows value of shipments data for industries and products. In tables 1a through 5a, these data represent the total value of shipments of all establishments classified in a particular industry. The data include the shipments of the products classified in the industry (primary to the industry), products classified in other industries (secondary to the industry), and miscellaneous receipts (repair work, sale of scrap, research and development, installation receipts, and resales). Value of product shipments shown in table 6a represents the total value of all products shipped that are classified as primary to an industry.

CENSUS DISCLOSURE RULES

In accordance with Federal law governing census reports, no data are published that would disclose the data for an individual establishment or company. However, the number of establishments classified in a specific industry is not considered a disclosure, so this information may be released even though other information is withheld.

The disclosure analysis for the industry statistics in tables 1a through 5a of this report is based on the total value of shipments. When the total value of shipments cannot be shown without disclosing information for individual companies, the complete line is suppressed. However, the suppressed data are included in higher-level totals. Additional disclosure analysis is performed for new capital expenditures that can be suppressed even though value of shipments data are publishable.

SPECIAL TABULATIONS

Special tabulations of data collected in the 1987 Census of Manufactures may be obtained on computer tape or in tabular form. The data will be in summary form and subject to the same rules prohibiting disclosure of confidential

information (including name, address, kind of business, or other data for individual business establishments or companies) as are the regular publications.

Special tabulations are prepared on a cost basis. A request for a cost estimate, as well as exact specifications on the type and format of the data to be provided, should be directed to the Chief, Industry Division, Bureau of the Census, Washington, DC 20233.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in this publication:

- Represents zero.
- (D) Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
- (NA) Not available.
- (NC) Not comparable.
- (S) Withheld because estimate did not meet publication standards.
- (X) Not applicable.
- (Z) Less than half the unit shown.
- do Ditto.

- n.e.c. Not elsewhere classified.
- n.s.k. Not specified by kind.
- pt. Part.
- r Revised.
- SIC Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

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Durables	Kenneth Hansen	(301) 763-7304
Nondurables	Michael Zampogna	(301) 763-2510
Current Industrial Reports		
Durables	Malcolm Bernhardt	(301) 763-2518
Nondurables	Thomas Flood	(301) 763-5911
Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356

Users' Guide for Locating Statistics in This Report by Table Number

For explanation of terms, see appendixes

Item	Four-digit industry statistics							Five-digit product class and seven-digit product statistics			
	Historical	Operating ratios	By geographic area	Summary and supplemental	By employment size	By industry and product class specialization	Materials consumed by kind	Industry-product analysis	Product shipments	Product class by geographic area	Historical product class
Number of companies	1a			3a					*6a		
Number of establishments . . .	1a		2	3a	4	5a					
Employment and payroll:											
Number of employees	1a	1b	2	3a	4	5a					
Payroll	1a	1b	2	3a	4	5a					
Supplemental labor costs . . .				3a							
Production workers	1a	1b	2	3a	4	5a					
Production- worker hours . . .	1a	1b	2	3a	4	5a					
Production- worker wages . . .	1a	1b	2	3a	4	5a					
Shipments, cost of materials, and value added:											
Value of shipments (four-digit)	1a	1b	2	3a	4	5a		5b			
Product class shipments (five-digits)									6a	6b	6c
Product shipments (seven-digit)									6a		
Value added by manufacture	1a	1b	2	3a	4	5a					
Cost of materials	1a	1b	2	3a	4	5a					
Fuels and electric energy . . .				3a							
Materials consumed by kind .							7				
Inventories:											
Total, end of year	1a			3a	4						
By stage of fabrication				3a							
Capital expenditures, assets, rental payments, and purchased services:											
New capital expenditures . . .	1a		2	3b	4	5a					
Used plant and equipment expenditures				3b							
Gross assets				3b							
Depreciation				3b							
Retirements of buildings and machinery				3b							
Rental payments				3b							
Foreign content of materials consumed				3c							
Purchased services				3c							
Ratios:											
Specialization	1a			3a				5b			
Coverage	1a			3a				5b			

*Number of companies with shipments of more than \$100 thousand.

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DESCRIPTION OF INDUSTRIES AND SUMMARY OF FINDINGS

This report shows 1987 Census of Manufactures statistics for establishments classified in each of the following industries:

SIC code and title

2812	Alkalies and Chlorine
2813	Industrial Gases
2816	Inorganic Pigments
2819	Industrial Inorganic Chemicals, N.E.C.

The industry statistics (employment, payroll, cost of materials, value of shipments, inventories, etc.) are reported for each establishment as a whole. Aggregates of such data for an industry reflect not only the primary activities of the establishments but also their activities in the manufacture of secondary products as well as their miscellaneous activities (contract work on materials owned by others, repair work, etc.). This fact should be taken into account when comparing industry statistics (tables 1 through 5a) with product statistics (table 6) showing shipments by all industries of the primary products of the specified industry. The extent of the "product mix" is indicated in table 5b, which shows the value of primary and secondary products shipped by establishments classified in the specified industry and the value of primary products of the industry shipped as secondary products by establishments classified in other industries.

Small single-establishment companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. For these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated), data on payrolls and receipts were obtained from administrative records of other Federal agencies. The remaining statistics were developed from industry averages.

Establishment data were tabulated based on industry definitions included in the 1987 Standard Industrial Classification (SIC) Manual¹. The 1987 edition represents a major revision for manufacturing industries from the 1972 edition and its 1977 supplement. In addition to the 1987 SIC revision, changes were made to the product class (five-digit) and product code (seven-digit) categories. The

product class and product code comparability between the 1987 and 1982 censuses is shown in the appendixes. These appendixes present, in tabular form, the linkage from 1987 to 1982.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

INDUSTRY 2812, ALKALIES AND CHLORINE

This industry is made up of establishments primarily engaged in manufacturing alkalies and chlorine. Establishments primarily engaged in mining natural alkalies are classified in Mining, industry 1474. Products of this industry also are collected in the Current Industrial Reports MA-28A and M-28A, Inorganic Chemicals (annual and monthly reports).

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

In the 1987 Census of Manufactures, Industry 2812, Alkalies and Chlorine, had employment of 5.0 thousand. The employment figure was 34 percent below the 7.6 thousand reported in 1982. Compared with 1986, employment decreased 25 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses. The leading States in employment in 1987 were West Virginia, Louisiana, Texas, and Alabama, accounting for 55 percent of the industry's employment. This represents a shift from 1982 when New York, West Virginia, Louisiana, and Texas accounted for 55 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$1.5 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 2812 shipped \$1.3 billion of alkalies and chlorine products considered primary to the industry, \$217.9 million of secondary products, and had \$11.5 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 86 percent (specialization ratio). In 1982, the specialization ratio was 81 percent.

¹Standard Industrial Classification Manual: 1987. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.

Establishments in this industry also accounted for 65 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 53 percent. The products primary to industry 2812, no matter in what industry they were produced, appear in table 6a and aggregate to \$2.0 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the alkalis and chlorine industry amounted to \$809.0 million. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 1 percent of total value of shipments.

INDUSTRY 2813, INDUSTRIAL GASES

This industry is made up of establishments primarily engaged in manufacturing industrial gases (including organic) for sale in compressed, liquid, and solid forms. Establishments primarily engaged in manufacturing fluorine and sulfur dioxide are classified in industry 2819; those manufacturing household ammonia are classified in industry 2842; those manufacturing other ammonia are classified in industry 2873; those manufacturing chlorine are classified in industry 2812; and those manufacturing fluorocarbon gases are classified in industry 2869. Distributors of industrial gases and establishments primarily engaged in shipping liquid oxygen are classified in Wholesale Trade, industry 5169. Products of this industry also are collected in the Current Industrial Reports MA-28C and M-28C, Industrial Gases (annual and monthly reports).

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

In the 1987 Census of Manufactures, Industry 2813, Industrial Gases, had employment of 8.1 thousand. The employment figure was 11 percent above the 7.3 thousand reported in 1982. Compared with 1986, employment decreased 6 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses. The leading States in employment in 1987 were Texas, California, and Ohio, accounting for 30 percent of the industry's employment. This represents a shift from 1982 when Texas, California, and Pennsylvania also accounted for approximately 30 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$2.6 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous

receipts, such as resales and contract receipts. Industry 2813 shipped \$2.5 billion of industrial gas products considered primary to the industry, \$54.0 million of secondary products, and had \$80.1 million of miscellaneous receipts, resales, and contract work. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 98 percent (specialization ratio). In 1982, the specialization ratio also was 98 percent.

Establishments in this industry also accounted for 94 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 91 percent. The products primary to industry 2813, no matter in what industry they were produced, appear in table 6a and aggregate to \$2.6 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the industrial gases industry amounted to \$1.1 billion. No data were collected on the specific materials consumed by this industry.

Single-establishment companies in this industry with up to 5 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 7 percent of total value of shipments.

INDUSTRY 2816, INORGANIC PIGMENTS

This industry is made up of establishments primarily engaged in manufacturing inorganic pigments. Important products of this industry include black pigments, except carbon black, white pigments, and color pigments. Organic color pigments, except animal black and bone black, are classified in industry 2865, and those manufacturing carbon black are classified in industry 2895. Products of this industry also are collected in the Current Industrial Reports MA-28A and M-28A, Inorganic Chemicals (annual and monthly).

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

In the 1987 Census of Manufactures, Industry 2816, Inorganic Pigments, had employment of 8.3 thousand. The employment figure was 26 percent below the 11.2 thousand reported in 1982. Compared with 1986, employment decreased 9 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses. The leading States in employment in 1987 were Maryland, Pennsylvania, Tennessee, and Mississippi, accounting for 50 percent of the industry's employment. This represents a shift from 1982 when Ohio, Pennsylvania, Maryland, and New Jersey accounted for 45 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$2.4 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 2816 shipped \$2.2 billion of inorganic pigment products considered primary to the industry, \$132.8 million of secondary products, and had \$96.3 million of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 94 percent (specialization ratio). In 1982, the specialization ratio was 88 percent.

Establishments in this industry also accounted for 89 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 88 percent. The products primary to industry 2816, no matter in what industry they were produced, appear in table 6a and aggregate to \$2.4 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the inorganic pigments industry amounted to \$1.0 billion. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 20 employees were excluded from the mail portion of the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 5 percent of total value of shipments.

INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.

This industry is made up of establishments primarily engaged in manufacturing industrial inorganic chemicals, not elsewhere classified. Establishments primarily engaged in mining, milling, or otherwise preparing natural potassium, sodium, or boron compounds (other than common salt) are classified in industry 1474. Establishments primarily engaged in manufacturing household bleaches are classified in industry 2842; those manufacturing phosphoric acid are classified in industry 2874; and those manufacturing nitric acid, anhydrous ammonia, and other nitrogenous fertilizer materials are classified in industry 2873. Products of this industry also are collected in the Current Industrial Reports MA-28A and M-28A, Inorganic Chemicals (annual and monthly), and MA-28B and M-28B, Inorganic Fertilizer Materials and Related Products (annual and monthly).

The 1987 definition of this industry is the same as that used in the 1972/7 Standard Industrial Classification (SIC) system. The SIC number and title also are the same.

Beginning with 1954, statistics include information for government-owned, contractor-operated (GOCO) establishments, but exclude the activities of government-owned and/or operated plants. General statistics are shown for all plants (private and government) in table 1a and for privately owned and operated plants only in table 8. Data for all materials consumed, except fuels and electric energy, as well as data for fixed assets, capital expenditures, and inventories, are excluded for the GOCO plants because these are paid for by current billings to the U.S. Government. Value of shipments and value added by manufacture have been estimated for the GOCO plants from averages reported for commercial establishments in prior years. These establishments represent 47 percent of the industry's employment in 1987, compared with 36 percent in 1982.

In the 1987 Census of Manufactures, Industry 2819, Industrial Inorganic Chemicals, N.E.C., had employment of 72.2 thousand. The employment figure was 12 percent below the 81.7 thousand reported in 1982. Compared with 1986, employment decreased 4 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses. The leading States in employment in 1987 were South Carolina, Tennessee, Washington, and Ohio, accounting for 52 percent of the industry's employment. These same States were the leaders in 1982, when they accounted for 45 percent of the industry's employment.

The total value of shipments for establishments classified in this industry was \$13.2 billion.

Establishments in virtually all industries ship secondary products as well as products primary to the industry to which they are classified and have some miscellaneous receipts, such as resales and contract receipts. Industry 2819 shipped \$8.2 billion of industrial inorganic chemical products considered primary to the industry, \$825.5 million of secondary products, and had \$4.2 billion of miscellaneous receipts. Thus, the ratio of primary products to the total of both secondary and primary products shipped by establishments in the industry was 91 percent (specialization ratio). In 1982, the specialization ratio also was 91 percent.

Establishments in this industry also accounted for 80 percent of products considered primary to the industry no matter where they actually were produced (coverage ratio). In 1982, the coverage ratio was 77 percent. The products primary to industry 2819, no matter in what industry they were produced, appear in table 6a and aggregate to \$10.3 billion. For further explanation of specialization and coverage ratios, see table 5b and the appendixes.

The total cost of materials, services, and fuels and electric energy used by establishments classified in the industrial inorganic chemicals, n.e.c., industry amounted to \$5.6 billion. Data on specific materials consumed appear in table 7.

Single-establishment companies in this industry with up to 10 employees were excluded from the mail portion of

the census. The data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were

obtained from administrative records of other agencies or developed from industry averages. These establishments accounted for 4 percent of total value of shipments.

Table 1a. Historical Statistics for the Industry: 1987 and Earlier Years

[1987 industry definitions are the same as in the 1972/77 Standard Industrial Classification (SIC) system. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year ¹	All establishments ³			All employees		Production workers			Value added by manufacture ⁴ (million dollars)	Cost of materials ⁵ (million dollars)	Value of shipments (million dollars)	New capital expenditures ⁶ (million dollars)	End-of-year inventories ⁴ (million dollars)	Ratios	
	Companies ² (no.)	Total (no.)	With 20 employees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Specialization ⁷ (percent)	Coverage ⁸ (percent)
INDUSTRY 2812, ALKALIES AND CHLORINE															
1987 Census ----	27	45	31	5.0	165.3	3.5	7.3	110.0	732.1	809.0	1 547.9	68.4	110.9	86	65
1986 ASM -----	(NA)	(NA)	(NA)	6.7	218.3	4.5	9.0	137.2	1 028.0	957.9	2 010.9	122.1	131.2	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	8.2	263.2	5.6	11.2	168.0	1 073.7	978.4	2 042.4	175.2	163.9	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	7.4	239.7	5.1	10.6	161.8	869.6	984.0	1 872.4	149.5	171.3	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	7.3	217.9	4.8	9.8	136.8	765.0	898.6	1 666.8	200.3	181.0	(NA)	(NA)
1982 Census ----	35	51	33	7.6	215.7	5.0	9.8	134.9	728.8	856.3	1 570.5	134.4	199.9	81	53
1981 ASM -----	(NA)	(NA)	(NA)	7.5	201.7	4.9	10.0	124.9	703.7	852.5	1 542.9	199.1	125.2	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	7.4	177.1	5.0	9.0	110.5	584.1	777.9	1 354.1	131.7	113.2	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	7.5	164.1	5.0	10.0	101.9	548.8	661.4	1 210.7	134.9	85.4	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	10.8	216.9	7.3	15.0	139.6	712.8	869.1	1 586.3	284.6	118.1	(NA)	(NA)
1977 Census ----	30	49	33	11.8	215.9	8.0	16.0	136.2	822.5	826.7	1 654.8	220.0	141.8	63	58
1976 ASM -----	(NA)	(NA)	(NA)	13.3	209.2	8.8	17.9	133.6	960.4	852.7	1 797.7	222.8	156.4	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	14.1	203.5	9.8	19.9	133.1	897.9	749.5	1 633.2	183.4	133.6	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	13.7	182.5	9.9	19.9	123.4	697.8	601.0	1 282.4	163.7	110.7	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	13.3	164.6	9.7	19.5	111.8	463.0	416.0	884.0	67.9	63.1	(NA)	(NA)
1972 Census ----	28	48	39	13.3	152.0	9.6	18.9	102.6	455.6	365.5	823.2	61.5	60.4	65	65
INDUSTRY 2813, INDUSTRIAL GASES															
1987 Census ----	103	594	135	8.1	241.4	4.0	8.5	115.3	1 572.5	1 052.9	2 617.8	104.3	124.1	98	94
1986 ASM -----	(NA)	(NA)	(NA)	8.6	248.4	4.0	8.8	112.0	1 386.7	1 002.6	2 401.9	122.1	90.7	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	8.5	223.3	4.5	10.5	115.0	1 466.7	949.1	2 416.0	212.5	87.7	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	7.9	197.2	4.4	9.7	104.1	1 290.3	1 073.0	2 363.5	263.9	80.5	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	7.2	168.1	3.9	8.8	90.2	1 169.6	959.9	2 111.9	107.5	82.9	(NA)	(NA)
1982 Census ----	105	563	105	7.3	174.0	4.3	9.9	100.8	1 055.3	967.2	2 019.3	223.7	61.0	98	91
1981 ASM -----	(NA)	(NA)	(NA)	8.8	175.1	5.4	10.9	107.3	1 025.8	838.7	1 857.5	168.1	54.3	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	8.1	153.4	5.2	10.3	92.4	889.0	658.5	1 539.6	209.2	43.2	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	7.3	123.9	4.7	9.4	74.7	827.8	621.2	1 464.7	150.1	38.4	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	7.9	124.1	4.8	9.9	73.8	781.8	599.5	1 385.6	164.4	37.5	(NA)	(NA)
1977 Census ----	109	562	102	7.5	117.2	4.6	9.6	67.0	732.8	515.9	1 234.6	243.0	45.6	97	93
1976 ASM -----	(NA)	(NA)	(NA)	8.0	106.6	4.9	10.1	64.6	644.7	482.2	1 132.1	122.4	32.6	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	8.9	108.6	5.2	10.4	63.4	586.1	403.5	985.3	119.2	39.6	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	8.5	93.6	5.2	10.7	55.8	544.0	301.7	843.2	92.1	32.2	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	8.6	92.1	5.7	11.8	60.2	512.8	253.5	765.4	49.0	32.0	(NA)	(NA)
1972 Census ----	106	503	138	9.6	87.2	5.4	10.6	48.3	466.7	214.9	679.3	84.1	32.7	96	92
INDUSTRY 2816, INORGANIC PIGMENTS															
1987 Census ----	70	92	55	8.3	266.8	5.1	10.5	148.9	1 398.1	1 001.6	2 388.3	115.3	356.0	94	89
1986 ASM -----	(NA)	(NA)	(NA)	9.1	277.5	5.6	11.5	155.6	1 152.9	1 036.5	2 192.5	80.3	336.9	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	9.7	275.2	6.0	12.0	155.6	1 044.0	1 017.8	2 077.1	100.8	340.2	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	9.5	257.7	6.0	11.9	143.9	864.6	1 030.3	1 890.4	94.4	332.4	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	10.8	291.6	6.6	13.4	161.8	1 014.1	1 014.1	1 779.8	93.6	368.5	(NA)	(NA)
1982 Census ----	86	106	63	11.2	271.3	6.8	13.3	148.6	723.0	892.8	1 630.0	128.9	383.2	88	88
1981 ASM -----	(NA)	(NA)	(NA)	11.8	261.6	7.4	14.8	144.9	789.3	986.9	1 754.1	86.7	356.9	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	11.9	239.6	7.5	15.3	136.7	709.0	873.7	1 556.9	80.6	319.6	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	11.3	208.4	7.6	15.8	126.3	667.5	809.0	1 486.8	80.3	242.8	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	12.1	198.1	8.2	16.8	124.0	564.9	798.6	1 366.4	69.8	272.8	(NA)	(NA)
1977 Census ----	71	106	66	11.9	179.8	8.0	16.4	110.2	567.9	695.9	1 259.9	124.3	251.5	88	84
1976 ASM -----	(NA)	(NA)	(NA)	12.9	181.1	8.6	17.5	107.1	584.9	713.2	1 292.5	76.9	277.9	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	12.4	164.1	8.3	16.9	101.6	468.4	548.8	988.9	76.6	271.3	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	15.6	184.7	11.0	23.0	121.0	590.9	641.9	1 188.6	117.9	227.5	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	13.2	150.5	9.6	20.2	101.5	419.3	461.9	890.2	79.1	135.8	(NA)	(NA)
1972 Census ----	77	114	69	12.8	134.6	9.0	18.3	87.8	382.6	394.9	796.9	38.9	137.4	86	86
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.															
1987 Census ----	428	662	308	72.2	2 425.2	37.5	75.2	1 138.9	7 529.5	5 639.5	13 211.6	506.1	1 306.1	91	90
1986 ASM -----	(NA)	(NA)	(NA)	75.0	2 398.8	39.8	82.2	1 159.1	7 405.3	5 504.0	12 885.4	487.3	1 410.9	(NA)	(NA)
1985 ASM -----	(NA)	(NA)	(NA)	78.6	2 451.9	42.3	86.4	1 183.1	7 500.5	6 074.5	13 724.6	550.8	1 566.7	(NA)	(NA)
1984 ASM -----	(NA)	(NA)	(NA)	78.8	2 344.5	43.0	87.0	1 160.7	7 391.8	6 374.4	13 771.6	477.6	1 605.1	(NA)	(NA)
1983 ASM -----	(NA)	(NA)	(NA)	80.3	2 184.2	44.8	87.5	1 090.3	6 511.9	5 717.8	12 199.6	418.7	1 628.9	(NA)	(NA)
1982 Census ----	425	645	319	81.7	2 134.2	45.7	91.0	1 077.3	6 321.4	5 837.1	12 060.4	512.5	1 705.1	91	977
1981 ASM -----	(NA)	(NA)	(NA)	85.9	2 068.4	48.1	99.2	1 054.6	6 754.8	6 165.1	12 790.2	657.6	1 591.0	(NA)	(NA)
1980 ASM -----	(NA)	(NA)	(NA)	87.2	1 894.0	49.9	101.8	1 003.6	6 590.6	5 579.7	12 095.5	598.5	1 223.2	(NA)	(NA)
1979 ASM -----	(NA)	(NA)	(NA)	80.4	1 614.3	47.7	99.7	885.6	5 583.5	5 060.8	10 623.3	596.5	1 083.5	(NA)	(NA)
1978 ASM -----	(NA)	(NA)	(NA)	82.1	1 519.8	48.9	100.1	818.7	4 878.0	4 966.5	9 801.4	578.4	1 020.3	(NA)	(NA)
1977 Census ----	346	564	288	78.2	1 326.7	47.0	96.2	717.9	4 333.1	4 344.0	8 615.7	466.4	858.4	97	977
1976 ASM -----	(NA)	(NA)	(NA)	74.6	1 186.8	43.7	87.8	615.8	3 974.7	3 475.6	7 388.5	391.1	753.4	(NA)	(NA)
1975 ASM -----	(NA)	(NA)	(NA)	73.7	1 061.2	43.5	85.8	555.4	3 260.5	2 844.0	6 053.4	341.8	685.9	(NA)	(NA)
1974 ASM -----	(NA)	(NA)	(NA)	68.5	897.0	42.4	84.8	491.9	2 904.4	2 723.6	5 534.9	254.7	621.3	(NA)	(NA)
1973 ASM -----	(NA)	(NA)	(NA)	64.6	761.7	40.1	80.1	418.9	2 334.9	1 926.2	4 233.8	176.6	417.4	(NA)	(NA)
1972 Census ----	166	384	264	63.8	704.7	39.9	80.0	392.4	2 038.2	1 804.1	3 833.3	149.0	384.1	99	979

¹In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the Industry chapter.

²For the Census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

³Includes establishments with payroll at any time during year.

⁴Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture are not comparable to prior-year data.

⁵Detailed data on materials consumed by type are shown in table 7.

⁶Detailed data on new machinery and equipment expenditures are provided in table 3c.

⁷Represents ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for establishments classified in the industry.

⁸Represents ratio of primary products shipped by establishments classified in industry to total shipments of such products by all manufacturing establishments, wherever classified.

⁹Government-owned, contractor-operated establishments did not enter into calculation of primary product specialization ratio or coverage ratio as all dollar receipts for these establishments were included in miscellaneous receipts.

Table 1b. Selected Operating Ratios for the Industry: 1987 and Earlier Years

[1987 industry definitions are the same as in the 1972/77 Standard Industrial Classification (SIC) system. Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	Payroll per employee (dollars)	Production workers as percent of total employment (percent)	Annual hours of production workers (number)	Average hourly earnings of production workers (dollars)	Cost of materials as percent of value of shipments (percent)	Cost of materials and payroll as percent of value of shipments (percent)	Value added per employee (dollars)	Payroll as percent of value added (percent)	Value added per production worker hour (dollars)
INDUSTRY 2812, ALKALIES AND CHLORINE									
1987 Census	33 060	70	2 086	15.07	52	63	146 420	23	100.29
1986 ASM	32 582	67	2 000	15.24	48	58	153 433	21	114.22
1985 ASM	32 097	68	2 000	15.00	48	61	130 939	25	95.87
1984 ASM	32 391	69	2 078	15.26	53	65	117 514	28	82.04
1983 ASM	29 849	66	2 042	13.96	54	67	104 795	28	78.06
1982 Census	28 381	66	1 960	13.77	55	68	95 895	30	74.37
1981 ASM	26 893	65	2 041	12.49	55	68	93 827	29	70.37
1980 ASM	23 932	68	1 800	12.28	57	71	78 932	30	64.90
1979 ASM	21 880	67	2 000	10.19	55	68	73 173	30	54.88
1978 ASM	20 083	68	2 055	9.31	55	68	66 000	30	47.52
1977 Census	18 296	68	2 000	8.51	50	63	69 703	26	51.41
1976 ASM	15 729	66	2 034	7.46	47	59	72 211	22	53.65
1975 ASM	14 432	70	2 031	6.69	46	58	63 681	23	45.12
1974 ASM	13 321	72	2 010	6.20	47	61	50 934	26	35.07
1973 ASM	12 375	73	2 010	5.73	47	66	34 812	36	23.74
1972 Census	11 428	72	1 969	5.43	44	63	34 256	33	24.11
INDUSTRY 2813, INDUSTRIAL GASES									
1987 Census	29 802	49	2 125	13.56	40	49	194 136	15	185.00
1986 ASM	28 883	47	2 200	12.73	42	52	161 244	18	157.58
1985 ASM	26 270	53	2 333	10.95	39	49	172 553	15	139.69
1984 ASM	24 962	56	2 205	10.73	45	54	163 329	15	133.02
1983 ASM	23 347	54	2 256	10.25	45	53	162 444	14	132.91
1982 Census	23 835	59	2 302	10.18	48	57	144 562	16	106.60
1981 ASM	19 897	61	2 019	9.84	45	55	116 568	17	94.11
1980 ASM	18 938	64	1 981	8.97	43	53	109 753	17	86.31
1979 ASM	16 972	64	2 000	7.95	42	51	113 397	15	88.06
1978 ASM	15 708	61	2 063	7.45	43	52	98 962	16	78.97
1977 Census	15 626	61	2 087	6.98	42	51	97 707	16	76.33
1976 ASM	13 325	61	2 061	6.40	43	52	80 588	17	63.83
1975 ASM	12 202	58	2 000	6.10	41	52	65 854	19	56.36
1974 ASM	11 011	61	2 058	5.21	36	47	64 000	17	50.84
1973 ASM	10 709	66	2 070	5.10	33	45	59 628	18	43.46
1972 Census	9 083	56	1 963	4.56	32	44	48 615	19	44.03
INDUSTRY 2816, INORGANIC PIGMENTS									
1987 Census	32 145	61	2 059	14.18	42	53	168 446	19	133.15
1986 ASM	30 494	62	2 054	13.53	47	60	126 692	24	100.25
1985 ASM	28 371	62	2 000	12.97	49	62	107 629	26	87.00
1984 ASM	27 126	63	1 983	12.09	55	68	91 011	30	72.66
1983 ASM	27 000	61	2 030	12.07	57	73	70 194	38	56.57
1982 Census	24 223	61	1 956	11.17	55	71	64 554	38	54.36
1981 ASM	22 169	63	2 000	9.79	56	71	66 890	33	53.33
1980 ASM	20 134	63	2 040	8.93	56	72	59 580	34	46.34
1979 ASM	18 442	67	2 079	7.99	54	68	59 071	31	42.25
1978 ASM	16 371	68	2 049	7.38	58	73	46 686	35	33.63
1977 Census	15 109	67	2 050	6.72	55	70	47 723	32	34.63
1976 ASM	14 038	67	2 035	6.12	55	69	45 341	31	33.42
1975 ASM	13 233	67	2 036	6.01	55	72	37 774	35	27.72
1974 ASM	11 839	71	2 091	5.26	54	70	37 878	31	25.69
1973 ASM	11 401	73	2 104	5.02	52	69	31 765	36	20.76
1972 Census	10 515	70	2 033	4.80	50	66	29 891	35	20.91
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.									
1987 Census	33 590	52	2 005	15.14	43	61	104 287	32	100.13
1986 ASM	31 984	53	2 065	14.10	43	61	98 737	32	90.09
1985 ASM	31 194	54	2 043	13.69	44	62	95 426	33	86.81
1984 ASM	29 752	55	2 023	13.34	46	63	93 805	32	84.96
1983 ASM	27 200	56	1 953	12.46	47	65	81 095	34	74.42
1982 Census	26 122	56	1 991	11.84	48	66	77 379	34	69.47
1981 ASM	24 079	56	2 062	10.63	48	64	78 636	31	68.09
1980 ASM	21 720	57	2 040	9.86	46	62	75 580	29	64.74
1979 ASM	20 078	59	2 090	8.88	48	63	69 447	29	56.00
1978 ASM	18 511	60	2 047	8.18	51	66	59 415	31	48.73
1977 Census	16 965	60	2 047	7.46	50	66	55 410	31	45.04
1976 ASM	15 908	59	2 009	7.01	47	63	53 280	30	45.27
1975 ASM	14 398	59	1 972	6.47	47	65	44 240	33	38.00
1974 ASM	13 094	62	2 000	5.80	49	65	42 400	31	34.25
1973 ASM	11 791	62	1 998	5.23	45	63	36 144	33	29.15
1972 Census	11 045	63	2 005	4.90	47	65	31 947	35	25.48

Note: For qualifications of data, see footnotes on table 1a.

Table 2. Industry Statistics for Selected States: 1987 and 1982

[Excludes data for auxiliaries. States with 150 employees or more are shown. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1987											1982		
	All establishments		All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees ² (1,000)	Value added by manufacture (million dollars)	
	E ¹	Total (no.)	With 20 employees or more (no.)	Number ² (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)							Wages (million dollars)
INDUSTRY 2812, ALKALIES AND CHLORINE														
United States -----	-	45	31	5.0	165.3	3.5	7.3	110.0	732.1	809.0	1 547.9	68.4	7.6	728.8
Alabama -----	-	3	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Delaware -----	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Georgia -----	-	6	3	.3	9.0	.2	.4	5.9	30.7	44.9	75.6	(D)	BB	(D)
Louisiana -----	-	4	4	.7	23.5	.5	1.0	15.7	94.8	191.5	287.3	14.5	.9	87.4
New York -----	-	3	2	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Oregon -----	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Texas -----	-	3	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Washington -----	-	3	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.4	64.4
West Virginia -----	-	1	1	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Wyoming -----	-	1	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
INDUSTRY 2813, INDUSTRIAL GASES														
United States -----	-	594	135	8.1	241.4	4.0	8.5	115.3	1 572.5	1 052.9	2 617.8	104.3	7.3	1 055.3
Alabama -----	-	22	5	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
California -----	-	51	12	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.7	87.0
Georgia -----	E1	15	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.2	19.6
Illinois -----	-	24	6	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Indiana -----	-	14	7	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.4	75.3
Louisiana -----	-	30	8	.5	15.2	.3	.6	8.2	157.2	74.0	229.6	10.2	.4	86.9
Michigan -----	-	12	4	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
New Jersey -----	E2	18	6	.4	9.4	.2	.5	5.1	22.2	18.2	40.1	4.5	BB	(D)
New York -----	-	16	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.3	37.6
Ohio -----	-	36	12	.6	18.6	.2	.5	7.2	115.4	91.7	207.4	(D)	.4	59.0
Pennsylvania -----	-	38	6	.5	14.7	.2	.5	6.5	80.5	56.5	136.8	2.0	.5	62.1
South Carolina -----	E1	9	3	.2	5.2	.1	.1	1.5	14.6	12.9	27.4	(D)	(NA)	(NA)
Tennessee -----	E3	19	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Texas -----	-	64	17	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
West Virginia -----	-	14	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Wyoming -----	-	9	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
INDUSTRY 2816, INORGANIC PIGMENTS														
United States -----	-	92	55	8.3	266.8	5.1	10.5	148.9	1 398.1	1 001.6	2 388.3	115.3	11.2	723.0
California -----	E1	4	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Delaware -----	-	1	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Georgia -----	-	4	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Illinois -----	-	8	6	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.6	31.3
Maryland -----	-	6	6	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Mississippi -----	-	2	2	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Missouri -----	-	3	3	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
New Jersey -----	-	13	7	.6	19.4	.4	.8	12.6	57.1	53.6	108.4	.7	CC	(D)
New York -----	E8	5	1	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Ohio -----	-	6	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1.9	105.0
Pennsylvania -----	-	10	7	1.0	30.5	.6	1.2	15.5	96.1	75.2	168.4	5.1	1.1	49.5
Tennessee -----	-	4	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Texas -----	-	3	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.														
United States -----	-	662	308	72.2	2 425.2	37.5	75.2	1 138.9	7 529.5	5 639.5	13 211.6	506.1	81.7	6 321.4
Alabama -----	-	15	8	1.0	31.3	.5	1.2	15.6	121.7	164.1	286.3	11.2	1.2	67.8
Arkansas -----	-	7	4	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
California -----	E1	63	24	1.8	55.2	1.1	2.3	31.2	243.1	282.1	533.1	(D)	2.1	170.8
Connecticut -----	-	5	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Delaware -----	E1	4	3	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
Florida -----	E3	17	4	.2	6.3	.1	.3	3.7	22.9	29.7	53.5	(D)	.4	22.4
Georgia -----	-	36	16	1.4	40.3	.9	1.8	21.6	201.1	228.3	423.8	19.7	.8	113.4
Idaho -----	-	3	3	2.1	85.1	1.1	2.2	40.6	254.3	178.5	441.3	(D)	EE	(D)
Illinois -----	-	29	16	2.0	63.5	1.3	2.8	38.5	238.0	220.8	464.3	(D)	2.8	259.9
Indiana -----	-	20	8	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	CC	(D)
Iowa -----	E1	7	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.5	18.2
Kansas -----	-	6	4	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Kentucky -----	-	6	4	EE	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	2.6	194.4
Louisiana -----	-	32	15	1.9	66.1	1.3	2.6	43.0	234.5	387.9	616.9	38.8	2.9	244.1
Maryland -----	-	9	5	.9	28.8	.6	1.3	17.4	54.1	110.7	168.9	(D)	1.5	73.3
Massachusetts -----	-	11	6	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	2.2	108.3
Michigan -----	E1	11	5	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	EE	(D)
Mississippi -----	-	9	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	BB	(D)
Missouri -----	-	17	5	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.4	28.5
Montana -----	-	5	3	.3	9.3	.2	.4	5.5	22.2	43.5	65.5	(D)	BB	(D)

See footnotes at end of table.

Table 2. Industry Statistics for Selected States: 1987 and 1982—Con.

[Excludes data for auxiliaries. States with 150 employees or more are shown. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and geographic area	1987											1982		
	All establishments		All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	All employees ² (1,000)	Value added by manufacture (million dollars)	
	E ¹	Total (no.)	With 20 employees or more (no.)	Number ² (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)							Wages (million dollars)
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.—Con.														
New Jersey	-	33	20	2.3	78.5	1.2	2.6	39.7	343.7	365.5	714.2	11.6	3.1	226.4
New York	E1	28	12	.6	16.7	.4	.8	8.6	51.3	109.6	160.1	(D)	.9	69.9
North Carolina	-	17	8	2.1	67.4	1.4	2.9	39.6	264.2	118.5	379.6	(D)	2.8	271.1
Ohio	-	39	20	6.1	192.7	3.3	6.4	98.5	560.0	513.6	1 067.4	(D)	6.3	450.7
Oklahoma	-	15	6	CC	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	.8	49.1
Pennsylvania	E1	46	18	1.6	43.9	.9	1.9	22.6	183.7	153.6	345.9	15.6	2.8	165.7
Rhode Island	-	4	1	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	AA	(D)
South Carolina	-	8	5	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
Tennessee	-	18	14	10.9	352.9	5.5	11.6	158.3	1 120.1	428.6	1 554.2	(D)	15.3	1 206.4
Texas	-	63	34	3.8	127.1	2.5	5.1	76.2	449.2	541.7	985.0	103.0	4.3	296.5
Utah	E2	6	3	.2	5.7	.1	.3	2.3	15.5	23.5	39.5	(D)	(NA)	(NA)
Virginia	-	11	6	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	3.0	235.2
Washington	-	17	4	FF	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	FF	(D)
West Virginia	-	6	3	BB	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)
Wisconsin	-	8	2	AA	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(NA)	(NA)

Note: For qualifications of data, see footnotes on table 1a.

¹Payroll and sales data for some small single-unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other Government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at the time data were tabulated. The following symbols are shown for those States where estimated value of shipments data based on administrative-record data account for 10 percent or more of figure shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

²Statistics for some producing States have been withheld to avoid disclosing data for individual companies. However, for States with 150 employees or more, number of establishments is shown and employment-size range is indicated by one of the following symbols: AA—150 to 249 employees; BB—250 to 499 employees; CC—500 to 999 employees; EE—1,000 to 2,499 employees; FF—2,500 employees or more.

Table 3a. Summary Statistics for the Industry: 1987

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Alkalies and chlorine (SIC 2812)	Industrial gases (SIC 2813)	Inorganic pigments (SIC 2816)	Industrial inorganic chemicals, n.e.c. (SIC 2819)
Companies	27	103	70	428
All establishments	45	594	92	662
With 1 to 19 employees	14	459	37	354
With 20 to 99 employees	13	128	35	203
With 100 employees or more	18	7	20	105
Employment and labor costs:				
Employees	5.0	8.1	8.3	72.2
Compensation, total	215.8	295.5	327.8	3 022.5
Annual payroll	165.3	241.4	266.8	2 425.2
Fringe benefits	50.5	54.1	61.0	597.3
Social Security and other legally required payments	19.4	28.7	23.8	221.0
Employer payments and other programs	31.0	25.4	37.2	376.4
Production workers:				
Average for year	3.5	4.0	5.1	37.5
March	3.5	4.0	5.0	38.2
May	3.5	4.0	5.1	38.3
August	3.6	4.0	5.1	35.4
November	3.5	4.0	5.1	37.8
Hours	7.3	8.5	10.5	75.2
January to March	1.6	2.1	2.6	19.1
April to June	1.9	2.1	2.6	19.4
July to September	1.9	2.1	2.6	17.5
October to December	1.9	2.1	2.7	19.2
Wages	110.0	115.3	148.9	1 138.9
Value added by manufacture	732.1	1 572.5	1 398.1	7 529.5
Cost of materials ¹	809.0	1 052.9	1 001.6	5 639.5
Materials, parts, containers, etc., consumed ²	348.4	315.9	772.3	3 827.1
Resales	(D)	(D)	70.1	196.4
Fuels	83.5	52.9	77.5	337.2
Purchased electricity	342.6	620.2	70.5	982.9
Contract work	(D)	(D)	11.3	295.8
Quantity of electric energy used for heat and power:				
Purchased	12 743.3	16 671.3	1 699.3	27 457.1
Generated less sold	1 369.9	(S)	(D)	1 624.3
Total value of shipments	1 547.9	2 617.8	2 388.3	13 211.6
Primary products	1 318.6	2 483.7	2 159.2	8 171.5
Secondary products	217.9	54.0	132.8	825.5
Miscellaneous receipts, total	11.5	80.1	96.3	4 214.6
Value of resales	(D)	(D)	87.0	252.0
Contract receipts	(D)	(D)	(D)	3 915.6
Other miscellaneous receipts	(D)	(D)	(D)	47.0

See footnotes at end of table.

Table 3a. Summary Statistics for the Industry: 1987—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Alkalies and chlorine (SIC 2812)		Industrial gases (SIC 2813)		Inorganic pigments (SIC 2816)		Industrial inorganic chemicals, n.e.c. (SIC 2819)	
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)
Inventories by stage of fabrication:								
Beginning of 1987.....	116.2		108.0		330.5		1 356.1	
Finished goods.....	44.9		74.5		142.7		613.6	
Work in process.....	2.1		2.4		27.3		236.8	
Materials and supplies.....	69.1		31.0		160.5		505.6	
End of 1987.....	110.9		124.1		356.0		1 306.1	
Finished goods.....	38.9		82.3		144.8		582.3	
Work in process.....	1.4		2.2		36.6		225.5	
Materials and supplies.....	70.6		39.6		174.6		498.2	
Primary product specialization ratio.....	86		98		94		91	
Coverage ratio.....	65		94		89		80	

Note: For qualifications of data, see footnotes on table 1a.

¹Data on purchased services for the repair of buildings and machinery and for communication services are not included in cost of materials, etc., but are shown in table 3c.

²Data on materials consumed by type are shown in table 7. Data on amount purchased or transferred from foreign sources are shown in table 3c.

Table 3b. Gross Book Value of Depreciable Assets, Capital Expenditures, Retirements, Depreciation, and Rental Payments: 1987

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Alkalies and chlorine (SIC 2812)		Industrial gases (SIC 2813)		Inorganic pigments (SIC 2816)		Industrial inorganic chemicals, n.e.c. (SIC 2819)	
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)
Gross book value of depreciable assets:								
Total:								
Beginning of year.....	1 592.9		4 297.3		1 528.6		6 524.8	
New capital expenditures ¹	68.4		104.3		115.3		506.1	
Used capital expenditures.....	(D)		2.9		(D)		54.9	
Retirements.....	(D)		63.7		(D)		129.5	
End of year.....	1 634.1		4 340.7		1 621.7		6 956.3	
Buildings and other structures:								
Beginning of year.....	193.6		203.6		246.4		1 380.2	
New capital expenditures.....	5.2		6.0		8.0		74.3	
Used capital expenditures.....	(D)		.2		(D)		20.8	
Retirements.....	(D)		2.9		(D)		18.2	
End of year.....	197.7		206.8		252.3		1 457.0	
Machinery and equipment:								
Beginning of year.....	1 399.2		4 093.7		1 282.2		5 144.6	
New capital expenditures ¹	63.2		98.4		107.4		431.8	
Used capital expenditures.....	(D)		2.7		(D)		34.1	
Retirements.....	(D)		60.8		(D)		111.2	
End of year.....	1 436.4		4 133.9		1 369.4		5 499.2	
Depreciation charges during 1987:								
Total.....	93.7		289.7		97.9		411.8	
Buildings and other structures.....	8.5		16.6		11.8		68.9	
Machinery and equipment.....	85.2		273.0		86.1		342.9	
Rental payments:								
Total.....	12.7		11.8		9.1		38.7	
Buildings and other structures.....	1.7		4.1		1.8		11.8	
Machinery and equipment.....	11.0		7.7		7.3		26.9	

Note: Retirements and depreciation data for establishments not included in the ASM sample were extrapolated from the historical ratio of retirements or depreciation to assets. These ratios were developed at the industry level.

¹Data on new machinery and equipment expenditures by type are provided in table 3c.

Table 3c. Supplemental Industry Statistics Based on Sample Estimates: 1987

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Alkalies and chlorine (SIC 2812)		Industrial gases (SIC 2813)		Inorganic pigments (SIC 2816)		Industrial inorganic chemicals, n.e.c. (SIC 2819)	
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)
Purchased services:								
Cost of purchased services for the repair of—								
Buildings and other structures.....	3.9	(X)	18.5	(X)	10.1	(X)	21.6	(X)
Response coverage ratio (percent) ²	70.9	(X)	72.4	(X)	77.4	(X)	79.5	(X)
Machinery.....	29.9	(X)	32.3	(X)	27.2	(X)	119.9	(X)
Response coverage ratio (percent) ²	84.5	(X)	73.3	(X)	80.2	(X)	81.3	(X)
Cost of purchased communication services.....	2.1	(X)	3.5	(X)	3.0	(X)	23.0	(X)
Response coverage ratio (percent) ²	84.8	(X)	66.6	(X)	80.2	(X)	80.8	(X)
New machinery and equipment expenditures								
Automobiles, trucks, etc., for highway use.....	63.2	(X)	98.4	(X)	107.4	(X)	431.8	(X)
Computers and peripheral data processing equipment.....	.4	3	6.7	68	1.2	36	5.4	13
All other.....	1.0	3	2.3	12	4.4	13	10.3	10
Adjustment ratio ³	61.9	1	89.4	6	101.8	1	416.2	1
	1.2	(X)	1.2	(X)	1.7	(X)	1.3	(X)

See footnotes at end of table.

Table 3c. Supplemental Industry Statistics Based on Sample Estimates: 1987—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Item	Alkalies and chlorine (SIC 2812)		Industrial gases (SIC 2813)		Inorganic pigments (SIC 2816)		Industrial inorganic chemicals, n.e.c. (SIC 2819)	
	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)	Amount (million dollars)	Relative standard error of estimate ¹ (percent)
Cost of materials, components, parts, etc., used.....	348.4	(X)	315.9	(X)	772.3	(X)	3 827.1	(X)
Materials purchased or transferred from foreign sources ⁴	21.1	13	-	1	276.9	13	527.9	4
Materials purchased or transferred from domestic sources.....	327.3	1	315.9	1	495.4	8	3 299.2	1
Adjustment ratio ³	1.3	(X)	1.6	(X)	1.1	(X)	1.4	(X)

¹For description of relative standard error of estimate, see Qualifications of the Data in appendixes.

²Measure of extent to which respondents reported each item. Derived for each item by calculating the ratio of weighted employment for those sample establishments that reported the specific inquiry to total employment for all establishments classified in industry. (See appendixes for explanation of sample weight.)

³Detail has been adjusted upwards to account for nonresponse. Inverse of the ratio shown represents a measure of the response to the inquiry. (See appendixes for further explanation.)

⁴Data may understate the true cost of imported parts, components, and supplies since some respondents do not know the origin of these materials. Includes cases where materials were purchased from secondary suppliers or where they were transferred from company-operated warehouses or other distribution points. Direct purchases from foreign suppliers and importers by domestic manufacturing establishments are believed to be reported accurately.

Table 4. Industry Statistics by Employment Size of Establishment: 1987

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and employment size class	E ¹	All establishments (no.)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 2812, ALKALIES AND CHLORINE												
Total	-	45	5.0	165.3	3.5	7.3	110.0	732.1	809.0	1 547.9	68.4	110.9
Establishments with an average of—												
1 to 4 employees	E9	5	(Z)	.1	(Z)	(Z)	.1	.5	.4	.9	(Z)	.1
5 to 9 employees	E9	6	(Z)	1.1	(Z)	.1	.7	4.3	3.9	8.1	.2	.6
10 to 19 employees	E6	3	(Z)	1.2	(Z)	.1	.9	4.5	3.4	8.1	.2	.7
20 to 49 employees	-	4	.1	3.8	.1	.3	3.2	22.3	31.9	54.1	.3	7.4
50 to 99 employees	-	9	.6	17.7	.4	1.0	12.3	106.1	117.0	220.3	.8	15.9
100 to 249 employees	-	14	4.2	141.5	2.9	5.9	92.9	594.5	652.4	1 256.3	58.7	86.2
250 to 499 employees	-	2	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
500 to 999 employees	-	2	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Covered by administrative records ²	E9	14	.1	2.3	.1	.2	1.5	9.4	8.5	17.9	.5	1.3
INDUSTRY 2813, INDUSTRIAL GASES												
Total	-	594	8.1	241.4	4.0	8.5	115.3	1 572.5	1 052.9	2 617.8	104.3	124.1
Establishments with an average of—												
1 to 4 employees	E1	248	.4	11.0	.2	.5	5.6	124.7	53.4	176.9	7.5	7.7
5 to 9 employees	E1	100	.7	19.2	.5	1.0	12.7	186.7	108.1	289.4	6.7	13.7
10 to 19 employees	E1	111	1.5	42.7	.9	1.9	25.9	277.8	205.8	483.5	25.8	25.3
20 to 49 employees	E1	106	3.2	100.3	1.4	3.0	40.6	496.0	374.6	870.0	39.1	41.1
50 to 99 employees	-	22	1.4	40.5	.6	1.2	17.4	338.9	170.8	509.6	5.9	22.0
100 to 249 employees	-	7	.9	27.8	.4	.9	13.1	148.4	140.1	288.4	19.3	14.3
Covered by administrative records ²	E9	45	.2	4.6	.1	.3	2.2	39.0	29.7	68.7	1.8	1.4
INDUSTRY 2816, INORGANIC PIGMENTS												
Total	-	92	8.3	266.8	5.1	10.5	148.9	1 398.1	1 001.6	2 388.3	115.3	356.0
Establishments with an average of—												
1 to 4 employees	E7	10	(Z)	.5	(Z)	(Z)	.3	2.5	2.0	4.5	.1	.6
5 to 9 employees	E8	11	.1	1.7	(Z)	.1	1.0	6.6	8.6	15.2	.4	1.8
10 to 19 employees	E4	16	.2	5.6	.1	.3	3.1	26.7	22.3	48.9	1.1	6.6
20 to 49 employees	E1	22	.6	17.1	.4	.9	9.2	62.2	62.2	121.0	3.5	24.4
50 to 99 employees	-	13	.9	32.1	.6	1.3	17.9	134.4	106.9	233.4	13.5	48.4
100 to 249 employees	E2	11	2.1	66.5	1.2	2.5	36.3	322.2	223.6	551.5	26.6	109.3
250 to 499 employees	-	5	1.7	56.6	1.2	2.3	34.9	273.7	250.7	519.7	17.5	73.2
500 to 999 employees	-	4	2.6	86.8	1.6	3.2	46.3	569.9	325.4	894.2	52.5	91.6
Covered by administrative records ²	E9	30	.3	5.9	.2	.3	3.2	25.1	21.5	46.6	1.5	6.6

See footnotes at end of table.

Table 4. Industry Statistics by Employment Size of Establishment: 1987—Con.

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and employment size class	E ¹	All establishments (no.)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)	End-of-year inventories (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)					
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.												
Total -----	-	662	72.2	2 425.2	37.5	75.2	1 138.9	7 529.5	5 639.5	13 211.6	506.1	1 306.1
Establishments with an average of—												
1 to 4 employees -----	E4	147	.3	8.1	.2	.4	4.3	38.3	40.5	78.9	2.2	7.9
5 to 9 employees -----	E3	109	.7	20.1	.5	1.0	11.7	100.0	130.2	237.0	4.5	21.3
10 to 19 employees -----	E3	98	1.3	37.1	.8	1.6	20.5	178.4	150.2	328.0	13.7	31.9
20 to 49 employees -----	E1	139	4.5	127.8	2.8	6.0	72.6	626.6	672.1	1 297.1	56.1	192.3
50 to 99 employees -----	-	64	4.6	140.6	2.7	5.6	75.3	535.6	662.1	1 206.6	54.6	170.8
100 to 249 employees -----	-	67	10.5	349.2	6.2	13.1	190.8	1 407.3	1 636.4	3 037.0	229.7	379.9
250 to 499 employees -----	-	17	6.1	187.1	3.6	7.3	101.8	650.7	585.4	1 244.7	54.7	154.6
500 to 999 employees -----	-	10	6.6	227.4	4.2	8.8	134.6	625.1	741.8	1 386.4	60.9	246.4
1,000 to 2,499 employees -----	-	8	11.9	400.7	4.2	14.0	203.6	1 231.8	845.3	2 084.8	29.8	100.8
2,500 employees or more -----	-	3	25.5	927.1	9.7	17.5	323.7	2 135.6	175.5	2 311.1	-	-
Covered by administrative records ² -----	E9	184	1.1	24.1	.6	1.2	11.8	88.4	66.7	155.2	5.0	17.1

Note: For qualifications of data, see footnotes on table 1a. Data shown as a (D) are included in underscored figures above.

¹Payroll and sales data for some small single unit companies with up to 20 employees (cutoff varied by industry) were obtained from administrative records of other Government agencies rather than from census report forms. These data were then used in conjunction with industry averages to estimate the items shown for these small establishments. This technique was also used for a small number of other establishments whose reports were not received at the time data were tabulated. The following symbols are shown for those employment-size classes where estimated data based on administrative-record data account for 10 percent or more of figures shown: E1—10 to 19 percent; E2—20 to 29 percent; E3—30 to 39 percent; E4—40 to 49 percent; E5—50 to 59 percent; E6—60 to 69 percent; E7—70 to 79 percent; E8—80 to 89 percent; E9—90 percent or more.

²Report forms were not mailed to small single unit companies with up to 20 employees (cutoff varied by industry). Payroll and sales data for 1987 were obtained from administrative records supplied by other agencies of the Federal Government. Those data were then used in conjunction with industry averages to estimate the items shown. Data are also included in respective employment-size classes shown.

Table 5a. Industry Statistics by Industry and Primary Product Class Specialization: 1987

[Table presents selected statistics for establishments according to their degree of specialization in products primary to their industry. Measures of plant specialization shown are (1) industry specialization: ratio of primary product shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment; and (2) product class specialization: ratio of largest primary product class shipments to total product shipments (primary plus secondary, excluding miscellaneous receipts) for the establishment. See appendix for method of computing ratios. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry or product class code	Industry or primary product class	All establishments (number)	All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expenditures (million dollars)
			Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				
2812	Alkalies and chlorine:										
	All establishments in industry -----	45	5.0	165.3	3.5	7.3	110.0	732.1	809.0	1 547.9	68.4
	Establishments with this product class primary:										
28121	Chlorine, compressed or liquefied -----	8	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
28123	Sodium hydroxide (caustic soda) -----	16	2.7	90.2	2.0	3.9	60.4	345.3	354.1	706.6	31.0
28125	Other alkalies -----	7	.7	27.1	.5	1.1	19.3	166.4	141.9	303.0	14.4
2813	Industrial gases:										
	All establishments in industry -----	594	8.1	241.4	4.0	8.5	115.3	1 572.5	1 052.9	2 617.8	104.3
	Establishments with this product class primary:										
28132	Acetylene -----	72	.8	21.3	.4	.8	9.2	45.3	35.7	79.5	3.2
28133	Carbon dioxide -----	63	1.0	30.2	.5	1.0	15.9	175.5	109.8	284.8	20.9
28135	Nitrogen -----	219	2.5	77.6	1.1	2.3	33.1	424.3	356.2	776.7	42.9
28136	Oxygen -----	65	1.4	47.0	.7	1.5	22.7	428.9	308.5	738.4	17.4
28137	Other industrial gases, n.e.c. -----	64	1.7	44.9	1.0	2.1	27.1	388.6	174.7	560.9	11.7
2816	Inorganic pigments:										
	All establishments in industry -----	92	8.3	266.8	5.1	10.5	148.9	1 398.1	1 001.6	2 388.3	115.3
	Establishments with this product class primary:										
28161	Titanium pigments -----	9	3.9	132.4	2.3	4.8	72.5	905.4	605.3	1 512.9	74.1
28162	Other white opaque pigments -----	12	1.0	24.2	.6	1.3	16.1	96.7	131.7	221.8	18.4
28163	Chrome colors and other inorganic pigments -----	39	3.1	103.6	2.0	4.1	56.7	367.4	239.9	600.4	21.2
2819	Industrial inorganic chemicals, n.e.c.:										
	All establishments in industry -----	662	72.2	2 425.2	37.5	75.2	1 138.9	7 529.5	5 639.5	13 211.6	506.1
	Establishments with this product class primary:										
28193	Sulfuric acid -----	30	2.3	71.0	1.6	3.5	46.8	288.7	208.4	493.8	37.7
28194	Inorganic acids, except nitric, sulfuric, and phosphoric -----	9	.6	22.8	.4	1.0	14.3	116.4	121.4	241.1	6.4
28195	Aluminum oxide -----	7	2.9	104.4	2.2	4.3	71.6	205.4	522.1	726.6	41.3
28196	Other aluminum compounds -----	66	1.1	34.9	.7	1.4	19.4	99.7	164.8	264.0	20.2
28197	Potassium and sodium compounds, n.e.c. -----	64	5.0	167.4	3.3	6.8	105.1	703.6	820.0	1 536.3	46.0
28198	Chemical catalytic preparations -----	27	4.2	132.2	2.7	5.7	77.9	506.2	497.6	1 010.2	131.6
28199	Other inorganic chemicals, n.e.c. -----	177	18.7	587.0	10.7	22.1	298.2	2 341.2	2 224.2	4 592.9	203.0

Note: For qualifications of data, see footnotes on table 1a.

Table 5b. Industry-Product Analysis—Value of Shipments and Primary Product Shipments and Specialization and Coverage Ratios for the Industry: 1987 and Earlier Census Years

[An establishment is assigned to an industry based on shipment values of products representing largest amount considered primary to an industry. Frequently, establishment shipments comprise mixtures of products assigned to an industry (primary), those considered primary to other industries (secondary), and receipts for activities such as merchandising or contract work. Columns A-D show this product pattern for an industry, and column E shows primary product specialization ratio. The extent to which an industry's primary products are shipped by establishments classified in and out of an industry is shown in columns F-H and coverage ratio is shown in column I. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Industry and product group code	Industry and census year	Value of shipments					Value of primary product shipments				
		Total (million dollars)	Primary products (million dollars)	Secondary products (million dollars)	Miscellaneous receipts (million dollars)	Primary product specialization ratio col. B ÷ col. B+C (percent)	Total made in all industries (million dollars)	Made in this industry (million dollars)	Made in other industries (million dollars)	Coverage ratio col. B ÷ col. F (percent)	
		A	B	C	D	E	F	G	H	I	
2812	Alkalies and chlorine.....	1987..	1 547.9	1 318.6	217.9	11.5	86	2 033.5	1 318.6	715.0	65
		1982..	1 570.5	1 220.0	282.7	67.8	81	2 346.1	1 220.0	1 126.1	53
		1977..	1 655.0	1 034.6	610.7	9.7	63	1 786.7	1 034.7	752.0	58
2813	Industrial gases.....	1987..	2 617.8	2 483.7	54.0	80.1	98	2 631.1	2 483.7	147.3	94
		1982..	2 019.3	1 830.0	34.4	154.9	98	2 002.2	1 830.0	172.2	91
		1977..	1 234.6	1 111.4	33.0	90.2	97	1 199.1	1 111.4	87.7	93
2816	Inorganic pigments.....	1987..	2 388.3	2 159.2	132.8	96.3	94	2 425.5	2 159.2	266.2	89
		1982..	1 630.0	1 398.0	198.4	33.5	88	1 590.7	1 398.0	192.7	88
		1977..	1 259.9	1 077.6	145.5	36.8	88	1 339.2	1 077.6	261.6	84
2819	Industrial inorganic chemicals, n.e.c.....	1987..	13 211.6	8 171.5	825.5	4 214.6	91	10 257.9	8 171.5	2 086.4	80
		1982..	12 060.4	7 438.0	698.0	3 924.4	91	9 698.2	7 438.0	2 260.2	77
		1977..	8 615.7	5 312.7	770.9	2 532.1	87	6 920.3	5 312.7	1 607.6	77

Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
2812- --	ALKALIES AND CHLORINE				
	Total	(NA)	2 033.5	(NA)	2 346.1
28121 --	Chlorine, compressed or liquefied:				
28121 00	Chlorine, compressed or liquefied (for additional detail, see table 6a-2)....	23	786.9	24	440.8
28123 --	Sodium hydroxide (caustic soda):				
28123 00	Sodium hydroxide (caustic soda) (for additional detail, see table 6a-2) ...	24	970.2	24	1 584.2
28125 --	Other alkalies:				
28125 00	Other alkalies (for additional detail, see table 6a-2)	14	258.6	14	294.0
28120 --	Alkalies and chlorine, n.s.k.	(NA)	17.8	(NA)	27.1
28120 00	Alkalies and chlorine, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(Z)	(NA)	20.0
28120 02	Alkalies and chlorine, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	17.8	(NA)	7.1
2813- --	INDUSTRIAL GASES				
	Total	(NA)	2 631.1	(NA)	2 002.2
28132 --	Acetylene:				
28132 00	Acetylene (for additional detail, see table 6a-2)	32	118.4	37	136.0
28133 --	Carbon dioxide:				
28133 00	Carbon dioxide (for additional detail, see table 6a-2)	44	292.4	40	207.5
28135 --	Nitrogen:				
28135 00	Nitrogen (for additional detail, see table 6a-2)	19	746.6	21	632.0
28136 --	Oxygen:				
28136 00	Oxygen (for additional detail, see table 6a-2)	23	617.3	29	578.3
28137 --	Other industrial gases, including elemental, compressed, and liquefied types, n.e.c.: ³				
28137 00	Other industrial gases, including elemental, compressed, and liquefied types, n.e.c. (including argon and hydrogen) (for additional detail, see table 6a-2)	41	704.3	49	376.5
28130 --	Industrial gases, n.s.k.	(NA)	152.1	(NA)	71.9
28130 00	Industrial gases, n.s.k., typically for establishments with 5 employees or more (see note)	(NA)	84.3	(NA)	56.4
28130 02	Industrial gases, n.s.k., typically for establishments with less than 5 employees (see note)	(NA)	67.8	(NA)	15.5

See footnotes at end of table.

Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendixes. For comparability of product classes and product codes between 1982 and 1987, see appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987				1982			
		Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Quantity of production for all purposes	Product shipments ¹	
				Quantity ²	Value (million dollars)			Quantity ²	Value (million dollars)
2816- --	INORGANIC PIGMENTS								
	Total	(NA)	(X)	(X)	2 425.5	(NA)	(X)	(X)	1 590.7
28161 --	Titanium pigments	(NA)	(X)	(X)	1 482.2	13	(X)	(X)	845.8
28161 11	Titanium pigments, composite and pure (100 percent TiO ₂) (for additional detail, see table 6a-2)	4	(X)	(X)	1 482.2				
28161 21	Titanium pigment preparations	-	(X)	(X)	(⁴)				
28161 00	Titanium pigments, n.s.k.	(NA)	(X)	(X)	-				
28162 --	Other white opaque pigments	(NA)	(X)	(X)	277.1	(NA)	(X)	(X)	189.3
28162 13	White lead, basic carbonate and sulfate, excluding white lead in oil								
	1,000 s tons..	2	(⁵)	(⁵)	(⁵)	4	6.6	6.6	7.9
28162 24	Zinc oxide pigments	7		139.2	131.5	10	129.3	128.6	110.7
28162 30	Lithopone and other pigments and preparations based on zinc sulfide	1							
28162 40	Antimony oxide pigments	3	(S)	(S)	584.5	9	(S)	(S)	69.0
28162 50	Antimony oxide pigment preparations	2							
28162 60	All other inorganic white opaque pigments	-							
28162 00	Other white opaque pigments, n.s.k.	(NA)	(X)	(X)	475.6	(NA)	(X)	(X)	1.7
28163 --	Chrome colors and other inorganic pigments	(NA)	(X)	(X)	614.2	(NA)	(X)	(X)	529.3
28163 10	Chrome colors (for additional detail, see table 6a-2)	13	(X)	(X)	131.7	13	(X)	(X)	103.2
28163 27	White extender pigments, including barytes, blanc fixe, and whiting								
	1,000 s tons..	5		376.1	384.0	5	(S)	51.1	32.8
28163 31	Color pigments other than chrome colors and lakes and toners: Iron oxide pigments								
	1,000 s tons..	14	(S)	(S)	185.8	11	(S)	(S)	137.6
28163 41	Colored lead pigments: Red lead								
	1,000 s tons..	-	-	-	-	3	(D)	(D)	(D)
28163 45	Litharge	1	(D)	(D)	(D)	5	(D)	(D)	(D)
28163 88	Carbon blacks (bone and lamp), excluding furnace and channel carbon black and charcoal	3	(S)	(S)	2.0	4	4.6	**5.0	3.3
28163 89	Cadmium sulfide pigments	3	(D)	(D)	(D)	4	1.8	*2.9	7.0
28163 91	Ceramic colors	6		11.3	11.1	11	(S)	(S)	47.3
28163 95	All other color pigments, n.e.c., including ultramarine blue (excluding organic pigments, lakes, and toners): Containing lead	1	(D)	(D)	(D)	5	(S)	(S)	27.2
28163 97	Not containing lead	7	(S)	(S)	94.4	11	(S)	(S)	94.2
28163 00	Chrome colors and other inorganic pigments, n.s.k.	(NA)	(X)	(X)	38.7	(NA)	(X)	(X)	32.7
28160 --	Inorganic pigments, n.s.k.	(NA)	(X)	(X)	52.0	(NA)	(X)	(X)	26.3
28160 00	Inorganic pigments, n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	(X)	6.5	(NA)	(X)	(X)	16.9
28160 02	Inorganic pigments, n.s.k., typically for establishments with less than 20 employees (see note)	(NA)	(X)	(X)	45.6	(NA)	(X)	(X)	9.4

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
2819- --	INDUSTRIAL INORGANIC CHEMICALS, N.E.C.				
	Total	(NA)	10 257.9	(NA)	9 698.2
28193 --	Sulfuric acid: Sulfuric acid (for additional detail, see table 6a-2)	50	557.4	56	586.0
28194 --	Inorganic acids, except nitric, sulfuric, and phosphoric: Inorganic acids, except nitric, sulfuric, and phosphoric (for additional detail, see table 6a-2)	52	466.5	53	478.6
28195 --	Aluminum oxide: Aluminum oxide, except natural alumina (100 percent Al ₂ O ₃) (for additional detail, see table 6a-2)	8	616.6	7	844.2
28196 --	Other aluminum compounds: Other aluminum compounds (for additional detail, see table 6a-2)	34	411.4	28	376.8
28197 --	Potassium and sodium compounds, except alkalis, alums, and bleaches: Potassium and sodium compounds, except alkalis, alums, and bleaches (for additional detail, see table 6a-2)	76	1 407.5	70	1 462.8
28198 --	Chemical catalytic preparations: Chemical catalytic preparations (for additional detail, see table 6a-2)	33	1 061.2	30	676.5
28199 --	Other inorganic chemicals, n.e.c.: Other inorganic chemicals, n.e.c. (for additional detail, see table 6a-2)	230	5 235.0	217	4 790.7

See footnotes at end of table.

Table 6a-1. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendices. For comparability of product classes and product codes between 1982 and 1987, see appendices. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987		1982	
		Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)	Number of companies with shipments of \$100,000 or more	Value of product shipments ¹ (million dollars)
2819—	INDUSTRIAL INORGANIC CHEMICALS, N.E.C.—Con.				
28190 —	Industrial inorganic chemicals, n.e.c., n.s.k.	(NA)	502.3	(NA)	482.6
28190 00	Industrial inorganic chemicals, n.e.c., n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	343.9	(NA)	406.0
28190 02	Industrial inorganic chemicals, n.e.c., n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	158.5	(NA)	76.6

Note: In 1987 Census of Manufactures, data for establishments of small single unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoffs used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1987 and 1982 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

¹Data reported by all producers, not just those with shipments of \$100,000 or more.

²For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

³Excludes hydrocarbon gases such as propane, butane, and propylene, or halogenated hydrocarbons and cyclopropane, which are reported to the U.S. International Trade Commission. Also, excludes sulfur dioxide, which is classified as primary to industry 2819; chlorine, primary to industry 2812; and helium produced in Government-owned plants.

⁴Prior to 1987, data for titanium dioxide pigment preparations were typically reported under product class 281612, Other White Opaque Pigments. Only 100% titanium dioxide was reported under product class 28161. For 1987, product code 28161 21 is included with product code 28162 00 to agree with previously reported figures.

⁵For 1987, product code 28162 13 is included with product codes 28162 30, 28162 40, 28162 50, and 28162 60 to avoid disclosing data for individual companies.

Table 6a-2. Related Products From Current Industrial Reports Series—Value of Shipments by All Producers: 1987 and 1982

[Additional detail is provided in the Current Industrial Report series. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987 product shipments		1982 product shipments	
		Quantity	Value (million dollars)	Quantity	Value (million dollars)
	MA28A, INORGANIC CHEMICALS				
28121 —	Chlorine (100 percent Cl)	(X)	785.7	(X)	453.0
28121 11	Gas	402.7	54.3	852.0	71.0
28121 15	Liquid	5 459.0	731.4	4 480.4	382.0
28123 —	Sodium hydroxide (caustic soda)	(X)	984.6	(X)	1 574.4
28123 61	Liquid, 68 to 74 percent	(D)	(D)	185.4	38.3
28123 65	Liquid, all other	9 372.1	890.9	7 511.6	1 417.4
28123 67	Dry (all forms)	(D)	(D)	304.0	118.7
28125 —	Other alkalis	(X)	256.5	(X)	288.5
	Potassium hydroxide (caustic potash) (88 to 92 percent KOH):				
28125 21	Liquid	209.6	88.6	147.5	60.1
28125 23	Solid	(D)	(D)	(D)	(D)
28125 30	Finished sodium bicarbonate (100 percent Na ₂ O)	(D)	(D)	325.7	102.2
28125 35	Peroxides of sodium and potassium	(D)	(D)	(NA)	(NA)
28125 40	Potassium carbonate	(D)	(D)	(NA)	(NA)
28125 90	Alkalies, n.e.c. (including soda ash, sal soda, modified sodas, etc.; excluding alkaline detergents)	(X)	(D)	(X)	(D)
28120 00	Alkalies and chlorine, n.s.k.	(X)	4.7	(X)	20.0
28161 11	Titanium dioxide pigments (composite and pure) (commodity weight)	958.8	1 440.0	659.0	839.2
	Chrome colors:				
28163 13	Chrome oxide green (C.P.)	(D)	(D)	4.0	10.3
28163 15	Chrome yellow and orange (C.P.)	20.6	32.1	21.0	43.8
28163 17	Molybdate chrome orange (C.P.)	5.0	11.7	6.3	20.3
28163 18	Zinc yellow (zinc chromate) (C.P.)	2.2	3.9	(D)	(D)
28163 19	Other chrome colors (C.P.)	(D)	(D)	(D)	(D)
28193 00	Sulfuric acid, gross (new and fortified)(100 percent H ₂ SO ₄) .. 1,000 s tons..	11 226.1	561.6	11 301.5	605.8
28194 —	Inorganic acids, except nitric, sulfuric, and phosphoric	(X)	559.4	(X)	474.5
28194 11	Boric (boracic) (100 percent H ₃ BO ₃)	(D)	(D)	(D)	(D)
28194 21	Chlorosulfonic (100 percent SO ₂ ClOH)	(D)	(D)	(NA)	(NA)
	Hydrochloric acid, including anhydrous (100 percent HCl)	1 350.3	108.7	879.5	110.8
28194 41	From salt and acid	(D)	(D)	(D)	(D)
28194 45	From chlorine and hydrogen	224.4	17.4	(D)	(D)
28194 47	Byproduct and other	(D)	(D)	582.0	71.1
28194 51	Hydrocyanic, including anhydrous (100 percent HCN)	71.2	31.9	55.8	32.6
	Hydrofluoric (100 percent HF) produced and withdrawn from system:				
28194 61	Anhydrous	(D)	(D)	114.8	139.6
28194 65	Technical	(D)	(D)	10.3	13.0
28194 67	Mixed (sulfuric and nitric) (commodity weight)	(D)	(D)	38.9	7.1
28194 71	Perchloric (100 percent HClO ₄)	(D)	(D)	(NA)	(NA)
28194 98	Other inorganic acids, n.e.c. (including chlorosulfonic and perchloric)	(X)	102.6	(X)	93.6

Table 6a-2. **Related Products From Current Industrial Reports Series—Value of Shipments by All Producers: 1987 and 1982—Con.**

[Additional detail is provided in the Current Industrial Report series. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987 product shipments		1982 product shipments	
		Quantity	Value (million dollars)	Quantity	Value (million dollars)
MA28A, INORGANIC CHEMICALS—Con.					
28195 00	Aluminum oxide, except natural alumina (100 percent Al ₂ O ₃).....1,000 s tons..	4 276.5	621.0	3 601.2	840.5
28196 --	Other aluminum compounds.....	(X)	433.0	(X)	371.8
	Chloride:				
28196 13	Liquid and crystal (100 percent AlCl ₃).....1,000 s tons..	(D)	(D)	(D)	(D)
28196 17	Anhydrous (100 percent AlCl ₃).....do..	(D)	(D)	(D)	(D)
28196 25	Hydroxide, trihydrate (100 percent Al ₂ O ₃ ·3H ₂ O).....do..	700.2	135.2	518.2	111.9
28196 27	Fluoride (technical).....do..	(D)	(D)	84.0	61.2
	Sulfate:				
28196 51	Commercial (17 percent Al ₂ O ₃) including municipalities ..1,000 s tons..	1 185.6	125.7	1 077.3	136.2
28196 55	Iron-free (17 percent Al ₂ O ₃).....do..	148.3	18.0	61.1	7.3
28196 73	Aluminates (sodium aluminate, potassium aluminate, etc. (100 percent by weight).....do..	75.1	25.5	(NA)	(NA)
28196 79	Other inorganic aluminum compounds (light aluminum hydroxide, cryolite, etc.).....	(X)	69.8	(X)	33.5
28197 --	Potassium and sodium compounds (except bleaches, alkalis, and alums).....	(X)	1 706.6	(X)	2 026.9
	Potassium compounds, n.e.c.:				
28197 13	Iodide (100 percent KI).....1,000 s tons..	.8	15.2	.9	10.4
28197 16	Sulfate (100 percent K ₂ SO ₄).....do..	257.9	38.0	368.4	58.5
28197 18	Pyrophosphate (tetrapotassium pyrophosphate) (100 percent K ₄ P ₂ O ₇).....do..	19.3	14.9	18.4	16.6
28197 19	Potassium fluorosilicates (100 percent by weight).....do..	(D)	(D)	(NA)	(NA)
28197 20	Potassium bromides (100 percent by weight).....do..	(D)	(D)	(NA)	(NA)
28197 23	Potassium phosphates (100 percent by weight).....do..	(D)	(D)	(NA)	(NA)
28197 24	Potassium silicates (100 percent by weight).....do..	(D)	(D)	(NA)	(NA)
28197 17	Other potassium salts and compounds, n.e.c. including potassium, chlorate, nitrate, and perchlorate).....	(X)	122.7	(X)	141.1
28197 21	Sodium (metal) (100 percent Na).....1,000 s tons..	(D)	(D)	81.1	97.5
	Sodium compounds, n.e.c.:				
28197 27	Chlorate (100 percent NaClO ₃).....1,000 s tons..	247.1	71.3	280.1	100.7
28197 28	Bromides (100 percent by weight).....do..	(D)	(D)	(NA)	(NA)
28197 29	Hydrosulfide (sodium sulfhydrate) (100 percent NaSH).....do..	42.3	12.4	68.1	21.7
28197 30	Hydrosulfite (100 percent Na ₂ S ₂ O ₄).....do..	(D)	(D)	(D)	(D)
28197 31	Cyanides and cyanide oxides (100 percent by weight).....do..	(D)	(D)	(NA)	(NA)
	Phosphates:				
28197 32	Monobasic (100 percent NaH ₂ S ₂ PO ₄).....1,000 s tons..	(D)	(D)	(D)	(D)
28197 33	Dibasic (100 percent Na ₂ HPO ₄).....do..	20.6	19.9	19.7	16.1
28197 34	Tribasic (100 percent Na ₃ PO ₄).....do..	28.1	16.2	55.3	31.6
28197 35	Tetrabasic (pyro) (100 percent Na ₄ P ₂ O ₇).....do..	49.9	37.5	36.0	23.9
28197 36	Meta (100 percent NaPO ₃).....do..	39.7	35.3	49.5	43.9
28197 37	Acid pyro (100 percent Na ₂ H ₂ P ₂ O ₇).....do..	32.6	32.6	26.0	23.6
28197 38	Tripoly (100 percent Na ₅ P ₃ O ₁₀).....do..	610.6	385.0	633.8	429.0
28197 39	Other sodium phosphates.....	(X)	23.5	(X)	(¹)
	Silicates:				
28197 41	Soluble silicate glass (water glass, solid and liquid) (anhydrous).....1,000 s tons..	657.1	112.6	472.2	123.5
28197 42	Metasilicate pentahydrate (100 percent Na ₂ SiO ₃ ·5H ₂ O).....do..	56.3	15.7	47.4	17.7
28197 44	Metasilicate anhydrous (100 percent Na ₂ SiO ₃).....do..	60.5	22.3	68.3	31.6
28197 45	Orthosilicate (100 percent Na ₄ SiO ₄).....do..	(D)	(D)	(D)	(D)
28197 47	Sequisilicate (100 percent Na ₃ SiO ₄ ·5H ₂ O).....do..	-	-	(D)	(D)
28197 51	Silicofluoride (100 percent Na ₂ SiF ₆).....do..	19.3	6.4	27.9	8.1
	Sulfate:				
28197 61	High purity (100 percent Na ₂ SO ₄).....1,000 s tons..	453.9	40.9	401.3	36.5
28197 66	Lower purity (100 percent Na ₂ SO ₄) and Glauber's salt (100 percent Na ₂ SO ₄ ·10H ₂ O).....do..	339.6	18.5	503.5	41.0
28197 84	Sulfite (100 percent Na ₂ SO ₃).....do..	(D)	(D)	96.6	24.6
28197 85	Thiosulfate (hypo) (100 percent Na ₂ S ₂ O ₃ ·5H ₂ O).....do..	(D)	(D)	(D)	(D)
28197 87	Other sodium compounds, n.e.c. (including sodium bisulfate, bifluoride, borate, and fluoride and other sodium phosphates).....	(X)	426.1	(X)	1633.2
28198 00	Chemical catalytic preparations.....	(X)	1 047.6	(X)	602.5
28199 --	Other inorganic chemicals, n.e.c.....	(X)	5 514.3	(X)	4 852.5
28199 01	Reagent and high purity grades of inorganic chemicals refined from purchased technical grades.....	(X)	21.1	(X)	58.1
28199 02	Antimony compounds, excluding pigment grades.....	(X)	29.5	(X)	17.4
	Barium compounds:				
28199 03	Barium nitrates (100 percent Ba(NO ₃) ₂).....1,000 s tons..	(D)	(D)	(NA)	
28199 04	Carbonate (precipitated) (100 percent BaCO ₃).....do..	(D)	(D)	(D)	
28199 05	Sulfate (100 percent BaSO ₄).....do..	2.9	3.9	(NA)	18.2
28199 06	Other barium compounds, including barium chloride, peroxide, and sulfide; excluding pigment grades.....	(X)	17.4	(X)	
	Bismuth compounds:				
28199 07	Bismuth carbonate (100 percent (BiO) ₂ CO ₃).....	(X)	(²)	(X)	(D)
28199 09	Other bismuth compounds.....	(X)	11.0		
28199 10	Bromine (isolated) (100 percent Br).....1,000 s tons..	68.6	36.1	49.6	24.5
28199 11	Cadmium compounds.....	(X)	12.7	(X)	6.6
	Calcium compounds:				
28199 12	Carbide (commercial).....1,000 s tons..	221.6	78.3	201.8	78.5
28199 13	Carbonate (precipitated) (100 percent CaCO ₃).....do..	(D)	(D)	(D)	(D)
28199 14	Chloride (100 percent CaCl ₂).....do..	(D)	(D)	(D)	(D)
	Phosphates:				
28199 18	Monobasic (100 percent CaH ₄ (PO ₄) ₂ (21 percent P).....1,000 s tons..	610.9	138.6	62.6	34.7
28199 19	Dibasic (100 percent CaHPO ₄) (18.50 percent P).....do..	624.4	149.0	775.2	218.5
	Tribasic (100 percent Ca ₃ (PO ₄) ₂ (18 percent P).....do..	406.3	80.4	348.7	179.3
28199 20	Animal feed grades.....do..	(D)	(D)	(NA)	(NA)
28199 22	Other grades.....do..	(D)	(D)	(NA)	(NA)
28199 23	Other inorganic calcium compounds.....	(X)	35.7	(X)	213.0
	Carbon activated:				
28199 25	Granular carbons (dry weight).....1,000 s tons..	52.9	103.4	52.6	84.5
28199 27	Pulverized carbons (dry weight).....do..	55.9	51.4	53.4	51.7
	Chromium compounds:				
28199 33	Sodium bichromate and chromate (hydrous).....1,000 s tons..	49.1	28.8	(D)	(D)
28199 34	Other chromium compounds, including potassium bichromate; excluding chrome colors.....	(X)	67.7	(X)	68.5

Table 6a-2. **Related Products From Current Industrial Reports Series—Value of Shipments by All Producers: 1987 and 1982—Con.**

[Additional detail is provided in the Current Industrial Report series. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987 product shipments		1982 product shipments	
		Quantity	Value (million dollars)	Quantity	Value (million dollars)
MA28A, INORGANIC CHEMICALS—Con.					
28199 --	Other inorganic chemicals, n.e.c.—Con.				
	Copper compounds:				
28199 35	Cuprous oxide (100 percent Cu ₂ O) ----- 1,000 s tons..	(D)	(D)	4.8	10.9
28199 36	Copper hydroxides (100 percent by weight) ----- do..	(D)	(D)	(NA)	(NA)
28199 37	Other copper compounds, including copper cyanide and copper sulfate ----- do..	(X)	42.6	(X)	38.1
28199 38	Gold compounds ----- do..	(X)	183.2	(X)	(NA)
28199 39	Hydrogen peroxide (100 percent by weight) ----- 1,000 s tons..	142.9	167.7	93.7	98.3
28199 40	Iodine, crude or resublimed (100 percent I) ----- do..	(D)	(D)	(D)	(D)
	Iron compounds:				
28199 42	Ferric chloride (100 percent FeCl ₃) ----- 1,000 s tons..	133.1	20.4	123.8	23.6
28199 43	Iron oxides and hydroxides (100 percent by weight) ----- do..	(D)	(D)	(NA)	(NA)
28199 44	Other iron compounds, including ferrous sulfate ----- do..	(X)	26.8	(X)	13.6
28199 45	Lithium compounds ----- do..	(X)	(D)	(X)	(NA)
	Magnesium compounds:				
28199 48	Chloride (100 percent MgCl ₂) ----- 1,000 s tons..	35.0	7.6		
28199 49	Sulfate (100 percent MgSO ₄) ----- do..	20.2	10.0	(X)	93.4
28199 50	Other magnesium compounds, including magnesium and epsom salts ----- do..	(X)	65.1		
	Manganese compounds:				
28199 51	Dioxides (100 percent MnO ₂) ----- 1,000 s tons..	64.4	62.4		
28199 52	Other manganese compounds, including potassium, and other permanganates, battery grade, and manganese sulfate ----- do..	(X)	45.0	(X)	52.6
	Mercury and compounds:				
28199 5A	Mercury, redistilled (100 percent by weight) ----- 1,000 lb..	(D)	(D)	331.7	1.8
28199 5B	Other mercury compounds, including mercuric oxide; excluding mercuric fulminate and medicinal grades ----- do..	(X)	(D)	(X)	(D)
	Molybdenum compounds:				
28199 53	Oxides (100 percent by weight) ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
28199 54	Molybdates (ammonium molybdate, sodium molybdate, etc.) (100 percent by weight) ----- do..	(D)	(D)	(NA)	(NA)
28199 55	Other molybdenum compounds ----- do..	(X)	(D)	(X)	(NA)
	Nickel compounds:				
28199 56	Oxides and hydroxides (100 percent by weight) ----- 1,000 s tons..	(D)	(D)		
28199 57	Chloride (100 percent NiCl ₂) ----- do..	2	6	(X)	23.9
28199 58	Sulfate (100 percent NiSO ₄) ----- do..	(D)	(D)		
28199 59	Other nickel compounds ----- do..	(X)	10.2		
	Phosphorus and compounds:				
28199 6A	Phosphorus, elemental (technical) ----- 1,000 s tons..	323.8	409.8	360.5	489.2
28199 60	Oxychloride (100 percent POCl ₃) ----- do..	7.3	5.6	8.8	6.6
28199 61	Pentasulfide (100 percent P ₂ S ₅) ----- do..	58.0	47.9	53.2	43.9
28199 63	Trichloride (chloride) (100 percent PCl ₃) ----- do..	59.6	31.8	45.6	29.0
28199 64	Other phosphorus compounds, including phosphorus pentoxide ----- do..	(X)	(D)	(X)	(D)
28199 65	Rare earth compounds ----- do..	(X)	61.3	(X)	26.2
	Silicon compounds:				
28199 66	Silicon tetrachloride (silted) (100 percent SiCl ₄) ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
28199 67	Silica gel ----- do..	(X)	(X)	(X)	(D)
28199 68	Other silicon compounds ----- do..	(X)	54.5	(X)	(NA)
28199 73	Silver compounds ----- do..	(X)	183.3	(X)	(D)
	Strontium compounds:				
28199 71	Carbonate (100 percent SrCO ₃) ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
28199 72	Other strontium compounds ----- do..	(X)	(D)	(X)	(NA)
	Sulfur and sulfur compounds:				
28199 74	Sulfur, recovered elemental (by weight) ----- 1,000 met tons..	6 180.0	492.1	4 344.0	425.2
28199 75	Sulfur dioxide (produced for sale) (100 percent SO ₂) ----- 1,000 s tons..	206.5	30.3	127.5	20.7
28199 78	Other sulfur compounds, including sulfur chloride ----- do..	(X)	105.0	(X)	55.0
	Tin compounds:				
28199 82	Chloride (100 percent SnCl ₄) ----- do..	(X)	(D)	(X)	30.7
28199 83	Other tin compounds ----- do..	(X)	(D)		
	Tungsten compounds:				
28199 84	Tungstates (ammonium tungstate, sodium tungstate, etc.) (100 percent by weight) ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
28199 85	All other tungsten compounds ----- do..	(X)	(D)	(X)	(NA)
	Zinc compounds:				
28199 86	Oxide and peroxide (100 percent by weight) ----- 1,000 s tons..	86.6	68.8	(NA)	(NA)
28199 87	Sulfate (100 percent ZnSO ₄ H ₂ O) ----- do..	29.9	13.5	23.8	11.5
28199 88	Chloride (100 percent ZnCl ₂) ----- do..	(D)	(D)	(NA)	(NA)
28199 89	Other zinc compounds, excluding pigment grades ----- do..	(X)	16.3	(X)	23.7
28199 90	Platinum, radium, tantalum, and thallium ----- do..	(X)	(D)	(X)	(NA)
28199 98	All other inorganic chemicals, including nuclear fuels, titanium tetrachloride, and other titanium compounds ----- do..	(X)	1 649.4	(NA)	1 432.0
	Industrial chlorine and other inorganic bleaching compounds ----- 1,000 s tons..	194.6	174.3	(NA)	(NA)
28199 41	Liquid (sodium hypochlorite, etc.) (7 percent or more available chlorine or equivalent oxidizing value) (100 percent Cl equivalent) ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
28199 15	Dry (calcium hypochlorite, etc.) (50 percent or more available chlorine or equivalent oxidizing value) (100 percent Cl equivalent) ----- do..	(D)	(D)	(NA)	(NA)
28190 00	Industrial inorganic chemicals, n.s.k. ----- do..	(X)	176.1	(X)	435.1
MA28B, INORGANIC FERTILIZER MATERIALS AND RELATED PRODUCTS					
28193 --	Sulfuric acid, gross (new and fortified) ----- 1,000 s tons..	11 266.1	561.6	11 301.5	605.8
28193 11	Oleum, less than 40 percent ----- do..	888.5	60.3	721.1	50.6
28193 15	Oleum, 40 percent ----- do..	(D)	(D)	(D)	(D)
28193 17	Oleum, more than 40 percent ----- do..	(D)	(D)	(D)	(D)
28193 31	Other than oleum ----- do..	10 207.8	487.8	10 483.8	544.2

Table 6a-2. Related Products From Current Industrial Reports Series—Value of Shipments by All Producers: 1987 and 1982—Con.

[Additional detail is provided in the Current Industrial Report series. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987 product shipments		1982 product shipments	
		Quantity	Value (million dollars)	Quantity	Value (million dollars)
MA28C, INDUSTRIAL GASES					
28132 —	Acetylene..... bil cu ft..	3.1	121.4	2.8	155.3
28132 11	Produced for compression, including cylinder and pipeline..... do..	.9	64.1	1.3	90.9
28132 21	Produced for pipeline shipment (excluding that shipped to be compressed) and for consumption in same plant..... do..	2.2	57.3	1.5	64.4
28133 —	Carbon dioxide..... (X)		294.2	(X)	219.6
28133 01	Gas..... 1,000 s tons..... (S)		(S)	2 370.1	27.4
28133 02	Liquid..... do..	4 212.6	208.0	3 374.6	154.4
28133 31	Solid (dry ice)..... do..	339.8	34.0	344.1	37.8
28135 —	Nitrogen..... bil cu ft..	650.9	732.8	447.4	619.5
28135 11	Gas, produced for pipeline shipment..... do..	471.8	334.4	308.0	260.4
28135 21	Liquid produced for bulk delivery shipment to pipeline or to other air separation plants..... do..	13.2	27.0	8.6	12.9
28135 41	Liquid and gas, produced for cylinder and bulk delivery shipment..... do..	166.0	371.4	130.8	346.2
28136 —	Oxygen..... do..	376.7	620.5	322.2	600.6
28136 11	Gas, produced for pipeline shipment..... do..	294.0	405.6	253.7	377.9
28136 21	Liquid, produced for bulk shipment to pipeline or to other air separation plants..... do..				
28136 31	Liquid and gas produced for cylinder and bulk delivery shipment..... do..	82.7	214.9	68.5	222.7
28137 —	Elemental gases and other industrial gases, n.e.c..... (X)		574.3	(X)	2352.8
28137 15	Argon, high purity produced for cylinder and bulk delivery, pipeline shipments, and for consumption in same plant..... do..	10.8	196.8	7.4	120.8
	Hydrogen, liquid and gas:				
28137 21	Produced for cylinder and bulk delivery shipment..... bil cu ft..	10.5	126.7	10.2	84.5
28137 31	Produced for pipeline shipment and Government use..... do..	53.2	123.7	30.9	79.2
28137 98	Other industrial gases, n.e.c., including crude argon, nitrous oxide, carbon dioxide produced and transferred for further processing, and crude and high purity helium produced in privately owned plants..... (X)		127.1	(X)	68.3

¹Product codes 28197 39 and 28197 87 were combined in 1982 to avoid disclosing data for individual companies.

²Product code 28199 07, bismuth carbonate, is classified under SIC code 2833, and is excluded from this data.

Table 6b. Product Classes—Value of Shipments by All Producers for Specified States: 1987 and 1982

[Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than \$2 million in product class shipments or they disclose data for individual companies in 1987. For meaning of abbreviations and symbols, see introductory text. For comparability of product classes and product codes between 1982 and 1987 and explanation of terms, see appendixes]

Product class and geographic area	1987 value of product shipments	1982 value of product shipments	Product class and geographic area	1987 value of product shipments	1982 value of product shipments
28121, CHLORINE, COMPRESSED OR LIQUEFIED			28133, CARBON DIOXIDE		
United States.....	786.9	440.8	United States.....	292.4	207.5
Georgia.....	30.4	(NA)	California.....	28.2	21.5
Louisiana.....	270.8	125.7	Georgia.....	11.6	(NA)
New York.....	58.9	23.1	Illinois.....	19.5	13.5
Washington.....	60.8	31.2	Iowa.....	10.6	8.2
			Kansas.....	6.8	7.8
			Louisiana.....	13.1	19.9
28123, SODIUM HYDROXIDE (CAUSTIC SODA)			Oklahoma.....	10.8	(NA)
United States.....	970.2	1 584.2	Texas.....	29.5	24.3
Georgia.....	30.9	(NA)	Virginia.....	13.5	(NA)
Louisiana.....	352.0	556.0	Washington.....	4.7	(NA)
New York.....	47.1	72.0			
Washington.....	78.3	89.5	28135, NITROGEN		
			United States.....	746.6	632.0
28125, OTHER ALKALIES			California.....	80.5	76.5
United States.....	258.6	294.0	Colorado.....	7.7	6.7
			Florida.....	12.1	(NA)
28132, ACETYLENE			Georgia.....	6.5	(NA)
United States.....	118.4	136.0	Indiana.....	49.6	39.2
California.....	5.0	3.6	Louisiana.....	35.4	48.3
Maryland.....	2.1	(NA)	Michigan.....	9.4	5.7
Michigan.....	2.4	3.6	New York.....	30.6	26.7
New Jersey.....	2.2	3.2	North Carolina.....	10.5	(NA)
Ohio.....	6.2	4.3	Ohio.....	42.4	29.5
Pennsylvania.....	2.3	2.9	Oklahoma.....	10.6	13.7
			Pennsylvania.....	60.0	30.5
			South Carolina.....	13.7	(NA)
			Texas.....	153.3	125.1
			Washington.....	12.0	6.6
			West Virginia.....	21.0	15.6

Table 6b. **Product Classes—Value of Shipments by All Producers for Specified States: 1987 and 1982—Con.**

[Million dollars. Product classes covered are those that are economically significant and whose production is geographically dispersed, provided dispersion is not approximated by data in table 2. Also, product classes are not shown if they are miscellaneous or "not specified by type" classes. Statistics for some States are withheld because they are either less than \$2 million in product class shipments or they disclose data for individual companies in 1987. For meaning of abbreviations and symbols, see introductory text. For comparability of product classes and product codes between 1982 and 1987 and explanation of terms, see appendixes]

Product class and geographic area	1987 value of product shipments	1982 value of product shipments	Product class and geographic area	1987 value of product shipments	1982 value of product shipments
28136, OXYGEN			28195, ALUMINUM OXIDE		
United States	617.3	578.3	United States	616.6	844.2
Alabama	15.1	11.4	28196, OTHER ALUMINUM COMPOUNDS		
California	21.5	26.6	United States	411.4	376.8
Florida	3.9	(NA)	Alabama	8.7	11.5
New York	9.5	13.9	California	5.4	10.4
North Carolina	3.8	(NA)	Georgia	35.9	21.5
Ohio	83.0	55.9	Illinois	12.3	11.7
Pennsylvania	36.3	41.7	Louisiana	76.9	43.0
South Carolina	7.2	(NA)	Maine	4.9	(NA)
Texas	148.6	140.2	Mississippi	3.9	(NA)
Washington	10.6	6.0	New Jersey	21.4	(NA)
28137, OTHER INDUSTRIAL GASES, N.E.C.			Ohio	9.0	(NA)
United States	704.3	376.5	South Carolina	5.5	(NA)
Alabama	5.0	8.0	Texas	82.2	92.2
California	60.5	24.5	Washington	7.5	(NA)
Delaware	11.5	15.8	28197, POTASSIUM AND SODIUM COMPOUNDS, N.E.C.		
Georgia	4.0	2.4	United States	1 407.5	1 462.8
Illinois	10.8	10.0	Alabama	34.7	35.2
Kansas	44.8	31.0	California	77.0	136.5
Louisiana	110.4	58.9	Florida	7.9	8.5
Michigan	13.3	9.2	Georgia	95.6	81.4
New Jersey	10.8	12.5	Illinois	163.5	193.8
New York	50.7	15.1	Indiana	45.9	49.3
North Carolina	5.2	3.1	Louisiana	31.7	72.9
Ohio	43.6	23.0	Mississippi	55.4	54.1
Pennsylvania	32.8	28.0	Missouri	53.7	57.4
Texas	181.6	65.2	New Jersey	72.6	133.3
Washington	4.1	2.0	New York	91.4	80.0
West Virginia	9.7	7.0	North Carolina	14.9	(NA)
28161, TITANIUM PIGMENTS			Ohio	36.6	57.4
United States	1 482.2	845.8	Pennsylvania	20.1	52.8
28162, OTHER WHITE OPAQUE PIGMENTS			Tennessee	119.3	(NA)
United States	1 277.1	189.3	Texas	76.7	58.8
Illinois	16.4	20.1	Washington	44.8	(NA)
28163, CHROME COLORS AND OTHER INORGANIC PIGMENTS			28198, CHEMICAL CATALYTIC PREPARATIONS		
United States	614.2	529.3	United States	1 061.2	676.5
California	21.8	41.6	New Jersey	27.7	(NA)
Illinois	65.3	(NA)	Ohio	111.9	107.0
Maryland	53.1	(NA)	Texas	70.4	(NA)
New Jersey	57.4	51.8	28199, OTHER INORGANIC CHEMICALS, N.E.C.		
New York	38.4	(NA)	United States	5 235.0	4 790.7
Ohio	36.3	57.7	Alabama	189.4	159.7
Pennsylvania	111.5	70.6	Arkansas	41.1	41.5
Wisconsin	5.6	(NA)	California	159.2	136.1
28193, SULFURIC ACID			Colorado	14.3	15.2
United States	557.4	586.0	Georgia	66.8	45.4
Arizona	21.5	17.9	Illinois	259.7	255.1
California	49.8	49.0	Indiana	89.9	42.2
Florida	16.8	7.3	Kansas	43.8	(NA)
Illinois	17.3	30.3	Kentucky	114.9	(NA)
Louisiana	107.1	91.8	Louisiana	141.2	192.5
New Jersey	26.6	37.1	Maryland	59.6	87.0
Ohio	27.8	24.9	Massachusetts	98.0	144.0
Texas	97.8	82.0	Michigan	85.6	161.4
28194, INORGANIC ACIDS, EXCEPT NITRIC, SULFURIC, AND PHOSPHORIC			Mississippi	62.3	69.2
United States	466.5	478.6	Missouri	69.7	68.7
California	19.4	75.8	Nevada	34.7	(NA)
Florida	2.2	(NA)	New Jersey	431.4	196.9
Illinois	10.3	13.5	New York	222.2	232.1
Louisiana	117.0	72.1	North Carolina	251.9	222.3
New York	4.7	(NA)	Ohio	214.7	135.2
Ohio	10.4	33.2	Oklahoma	51.5	86.0
Texas	107.3	(NA)	Pennsylvania	225.3	271.4
			Tennessee	406.9	455.0
			Texas	385.1	266.0
			Washington	10.0	34.5
			West Virginia	125.6	(NA)
			Wisconsin	11.9	2.1

¹For 1987, titanium pigment preparations (product code 28161 21) are included with product class 28162.

Table 6c. Historical Statistics for Product Classes—Value Shipped by All Producers: 1987 and Earlier Years

[Million dollars. For meaning of abbreviations and symbols, see introductory text. For comparability of product classes and product codes between 1982 and 1987 and explanation of terms, see appendixes]

1987 product code	Product class	1987	1986 ¹	1985 ¹	1984 ¹	1983 ¹	1982	1977	1972
2812-	Alkalies and chlorine	2 033.5	1 978.1	2 163.8	2 253.0	2 224.5	2 346.1	1 786.7	805.7
28121	Chlorine, compressed or liquefied	786.9	740.2	765.0	753.7	588.3	440.8	520.0	210.2
28123	Sodium hydroxide (caustic soda)	970.2	953.4	1 069.8	1 136.5	1 307.7	1 584.2	997.0	410.9
28125	Other alkalies	258.6	222.5	267.7	303.8	304.3	294.0	263.0	181.3
28120	Alkalies and chlorine, n.s.k.	17.8	61.9	61.3	58.9	24.2	27.1	6.7	3.3
2813-	Industrial gases	2 631.1	2 444.2	2 462.3	2 389.9	2 072.0	2 002.2	1 199.1	659.1
28132	Acetylene	118.4	121.0	137.1	136.1	128.9	136.0	127.9	96.0
28133	Carbon dioxide	292.4	246.7	290.3	233.5	219.9	207.5	103.0	45.7
28135	Nitrogen	746.6	749.9	708.8	722.2	628.4	632.0	278.7	487.2
28136	Oxygen	617.3	550.7	564.8	623.2	627.4	578.3	375.1	
28137	Other industrial gases, n.e.c.	704.3	577.2	589.8	554.9	400.8	376.5	268.0	30.2
28130	Industrial gases, n.s.k.	152.1	198.8	231.5	120.0	66.6	71.9	46.4	
2816-	Inorganic pigments	2 425.5	2 195.2	2 112.5	1 933.3	1 691.1	1 590.7	1 339.2	756.2
28161	Titanium pigments	² 1 482.2	1 285.6	1 153.0	997.8	946.4	845.8	627.1	355.6
28162	Other white opaque pigments	² 277.1	192.2	201.6	217.5	192.1	189.3	204.8	99.9
28163	Chrome colors and other inorganic pigments	614.2	676.4	698.4	680.9	524.9	529.3	485.0	283.2
28160	Inorganic pigments, n.s.k.	52.0	41.0	59.6	37.0	27.7	26.3	22.3	17.5
2819-	Industrial inorganic chemicals, n.e.c.	10 257.9	9 932.3	10 244.5	10 489.8	9 819.8	9 698.2	6 920.3	3 008.8
28193	Sulfuric acid	557.4	553.2	585.7	587.4	611.7	586.0	427.1	245.4
28194	Inorganic acids, except nitric, sulfuric, and phosphoric	466.5	440.6	539.3	539.6	458.4	478.6	364.4	160.4
28195	Aluminum oxide	616.6	531.2	665.0	789.2	717.7	844.2	827.3	388.6
28196	Other aluminum compounds	411.4	387.5	405.6	440.9	408.4	376.8	312.3	175.5
28197	Potassium and sodium compounds, n.e.c.	1 407.5	1 423.6	1 485.0	1 621.3	1 582.7	1 462.8	1 102.8	503.1
28198	Chemical catalytic preparations	1 061.2	1 075.6	974.3	1 019.9	849.3	675.5	398.4	172.8
28199	Other inorganic chemicals, n.e.c.	5 235.0	5 183.2	5 224.8	4 988.0	4 721.5	4 790.7	3 375.3	1 334.6
28190	Industrial inorganic chemicals, n.e.c., n.s.k.	502.3	337.3	364.9	503.6	470.1	482.6	112.8	28.4

¹Figures are estimates derived from a representative sample of manufacturing establishments. Standard errors associated with estimates are published in annual survey of manufactures publications for this period.

²For 1987, Titanium pigment preparations (product code 28161 21) are included with product class 28162.

Table 7. Materials Consumed by Kind: 1987 and 1982

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987			1982		Materials made and consumed in same plant (quantity)
		Consumption of materials received from other establishments		Consumption of materials received from other establishments			
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)		
INDUSTRY 2812, ALKALIES AND CHLORINE							
	Materials, parts, containers, and supplies	(X)	348.4	(X)	(X)	324.2	(X)
	Inorganic chemicals:						
	Acids, except spent acids:						
287311	Nitric acid (100% HNO ₃)	1,000 s tons..	-	-	(X)	(D)	-
287410	Phosphoric acid (100% P ₂ O ₅)	do..	-	-	-	(D)	-
281931	Sulfuric acid (100% H ₂ SO ₄)	do..	49.9	3.4	-	46.5	(D)
281211	Chlorine (100% Cl ₂)	do..	15.2	2.4	365.4	**101.4	275.5
281996	Phosphorous, elemental (technical)	do..	-	-	(X)	-	-
281228	Sodium carbonate (soda ash) (58% Na ₂ O)	do..	(D)	(D)	-	74.1	(D)
281238	Sodium hydroxide (caustic soda) (100% NaOH)	do..	34.0	3.9	120.2	(S)	41.9
289911	Salt in brine	4 225.1	51.7	1 882.8	1 963.3	31.0	2 201.1
286003	Synthetic organic chemicals	(X)	(D)	(X)	(X)	(²)	(X)
147007	Crude chemical nonmetallic minerals, including barite, borate, potash, fluorspar, rock salt, etc., but excluding phosphate rock and pyrites	(X)	(D)	(X)	(X)	29.7	(X)
331210	Coke, including breeze, used as a raw material	1,000 s tons..	-	-	(X)	-	-
	Other parts, materials, and accessories:						
355911	Parts and attachments for machinery and equipment	(X)	40.5	(X)	(X)	47.9	(X)
265001	Paperboard boxes, containers, and corrugated paperboard	(X)	(D)	(X)	(X)	7.9	(X)
340001	Metal containers	(X)	(D)	(X)	(X)	5.5	(X)
970099	All other materials and components, parts, containers, and supplies	(X)	179.2	(X)	(X)	(¹)161.1	(X)
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	18.0	(X)	(X)	19.5	(X)

See footnotes at end of table.

Table 7. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendixes. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987			1982		
		Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)	Consumption of materials received from other establishments		Materials made and consumed in same plant (quantity)
		Quantity ¹	Delivered cost (million dollars)		Quantity ¹	Delivered cost (million dollars)	
INDUSTRY 2816, INORGANIC PIGMENTS							
	Materials, containers, and supplies -----	(X)	772.3	(X)	(X)	678.8	(X)
	Inorganic chemicals:						
	Acids, except spent acids:						
287311	Nitric acid (100% HNO ₃) ----- 1,000 s tons..	(D)	(D)	(X)	5.7	.7	(D)
287410	Phosphoric acid (100% P ₂ O ₅) ----- do..	(S)	8	-	**1.0	.6	-
281931	Sulfuric acid (100% H ₂ SO ₄) ----- do..	*257.9	13.6	(D)	254.8	16.1	443.3
281211	Chlorine (100% Cl) ----- do..	(D)	(D)	-	304.1	33.6	(D)
281996	Phosphorous, elemental (technical) ----- do..	-	-	(X)	-	-	-
281228	Sodium carbonate (soda ash) (58% Na ₂ O) ----- do..	5.4	1.0	-	(D)	(D)	(D)
281238	Sodium hydroxide (caustic soda) (100% NaOH) ----- do..	**125.1	12.4	-	62.1	10.4	(D)
289911	Salt in brine ----- do..	(D)	(D)	-	(D)	(D)	-
286003	Synthetic organic chemicals ----- do..	(X)	21.1	(X)	(X)	44.5	(X)
	Crude materials:						
109901	Bauxite ----- 1,000 s tons..	-	-	(X)	-	-	(X)
147501	Phosphate rock ----- do..	-	-	(X)	-	-	(X)
147901	Sulfur ----- 1,000 l tons..	(D)	(D)	(X)	(D)	(D)	(X)
100107	Iron and ferrous alloy ores, including tungsten, chromite, manganese, molybdenum, and cobalt -----	(X)	(D)	(X)	(X)	4.6	(X)
100207	Nonferrous metal ores, including copper, mercury, vanadium, titanium, platinum, etc. -----	(X)	238.9	(X)	(X)	153.3	(X)
147007	Crude chemical nonmetallic minerals, including barite, borate, potash, fluorspar, rock salt, etc., but excluding phosphate rock and pyrites -----	(X)	28.3	(X)	(X)	8.5	(X)
331210	Coke, including breeze, used as a raw material ----- 1,000 s tons..	272.9	30.2	(X)	168.9	25.7	(X)
	Other parts, materials, and accessories:						
355911	Parts and attachments for machinery and equipment -----	(X)	61.4	(X)	(X)	36.9	(X)
265001	Paperboard boxes, containers, and corrugated paperboard -----	(X)	10.8	(X)	(X)	16.2	(X)
340001	Metal containers -----	(X)	.7	(X)	(X)	3.0	(X)
970099	All other materials and components, parts, containers, and supplies -----	(X)	174.4	(X)	(X)	279.5	(X)
971000	Materials, containers, and supplies, n.s.k. ² -----	(X)	56.5	(X)	(X)	24.1	(X)
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C.							
	Materials, containers, and supplies ⁴ -----	(X)	3 827.1	(X)	(X)	3 805.5	(X)
	Inorganic chemicals:						
	Acids, except spent acids:						
287311	Nitric acid (100% HNO ₃) ----- 1,000 s tons..	*65.8	10.0	(X)	**42.7	7.2	(D)
287410	Phosphoric acid (100% P ₂ O ₅) ----- do..	260.1	77.2	358.5	121.8	46.4	390.9
281931	Sulfuric acid (100% H ₂ SO ₄) ----- do..	1 343.8	74.0	(D)	1 060.6	65.8	663.4
281211	Chlorine (100% Cl) ----- do..	142.4	20.1	(D)	(S)	11.0	(D)
281996	Phosphorous, elemental (technical) ----- do..	257.1	282.4	(X)	327.3	346.3	(D)
281228	Sodium carbonate (soda ash) (58% Na ₂ O) ----- do..	582.6	70.9	(D)	*975.8	124.4	193.2
281238	Sodium hydroxide (caustic soda) (100% NaOH) ----- do..	768.9	76.7	-	*553.1	99.4	(D)
289911	Salt in brine ----- do..	*568.2	11.0	96.5	555.0	12.3	(D)
286003	Synthetic organic chemicals ----- do..	(X)	107.0	(X)	(X)	(³)	(X)
	Crude materials:						
109901	Bauxite ----- 1,000 s tons..	8 443.5	282.5	(X)	6 894.5	289.6	(X)
147501	Phosphate rock ----- do..	**3 157.8	57.7	(X)	(S)	66.2	(X)
147901	Sulfur ----- 1,000 l tons..	1 006.5	114.0	(X)	1 146.6	144.5	(X)
100107	Iron and ferrous alloy ores, including tungsten, chromite, manganese, molybdenum, and cobalt -----	(X)	55.1	(X)	(X)	207.4	(X)
100207	Nonferrous metal ores, including copper, mercury, vanadium, titanium, platinum, etc. -----	(X)	187.2	(X)	(X)	43.2	(X)
147007	Crude chemical nonmetallic minerals, including barite, borate, potash, fluorspar, rock salt, etc., but excluding phosphate rock and pyrites -----	(X)	43.8	(X)	(X)	51.4	(X)
331210	Coke, including breeze, used as a raw material ----- 1,000 s tons..	*473.3	50.0	(X)	758.2	78.5	(X)
	Other parts, materials, and accessories:						
355911	Parts and attachments for machinery and equipment -----	(X)	106.3	(X)	(X)	130.7	(X)
265001	Paperboard boxes, containers, and corrugated paperboard -----	(X)	39.3	(X)	(X)	35.9	(X)
340001	Metal containers -----	(X)	26.1	(X)	(X)	22.9	(X)
970099	All other materials and components, parts, containers, and supplies -----	(X)	1 568.9	(X)	(X)	³ 1 598.3	(X)
971000	Materials, containers, and supplies, n.s.k. ² -----	(X)	567.0	(X)	(X)	424.1	(X)

¹For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

²Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

³For 1982, material code 286003 was included with material code 970099.

⁴Excludes data on materials purchased and consumed by Government-owned, contractor-operated plants.

Table 8. Statistics for Privately Owned and Operated Establishments: 1987 and 1982

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

Year	All establishments			All employees		Production workers			Value added by manufacture (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	Expenditures and assets		End-of-year inventories (million dollars)	Ratios	
	Companies (no.)	Total (no.)	With 20 employees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)				New capital expenditures (million dollars)	Gross value of fixed assets (million dollars)		Specialization (per-cent)	Coverage (per-cent)
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C. (TOTAL)¹																
1987 -----	428	662	308	72.2	2 425.2	37.5	75.2	1 138.9	27 529.5	35 639.5	413 211.6	5506.1	6 956.3	1 306.1	91	80
1982 -----	425	645	319	81.7	2 134.2	45.7	91.0	1 077.3	26 321.4	35 837.1	412 060.4	5512.5	5 496.7	1 705.1	91	77
INDUSTRY 2819, INDUSTRIAL INORGANIC CHEMICALS, N.E.C. (PRIVATELY-OWNED AND -OPERATED ESTABLISHMENTS)																
1987 -----	424	654	300	38.3	1 206.3	23.3	48.6	672.9	4 559.5	4 824.1	9 426.2	506.1	6 956.3	1 306.1	91	80
1982 -----	419	636	310	52.0	1 299.6	32.0	63.4	747.4	3 777.9	4 954.8	8 634.7	512.5	5 496.7	1 705.1	91	77

¹Includes both privately-owned and -operated plants and government-owned, contractor-operated plants.

²Data include value added for government-owned, contractor-operated plants which were estimated based on averages reported for commercial establishments in prior years.

³Data exclude government-owned materials furnished to government-owned, contractor-operated plants and include fuels and electric energy purchased by or for these plants.

⁴Data include a calculated value of shipments for government-owned, contractor-operated plants comprised of adjusted value added (estimated as described in footnote 2) plus cost of fuels and electric energy.

⁵Total excludes expenditures, inventories, and fixed assets of government-owned, contractor-operated plants.

⁶Government-owned, contractor-operated establishments did not enter into calculation of primary product specialization ratio or coverage ratio; all dollar receipts for these establishments were included in miscellaneous receipts.

Table 9. Employees Engaged in Construction and Value of Work Done: 1987

[For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendixes]

SIC code	Industry	Total		Establishments reporting construction employees ¹					Response coverage ratio C + A
		Employees (1,000)	Payroll (millions)	Total		Engaged in construction ²			
				Employees (1,000)	Payroll (millions)	Employees (1,000)	Payroll (millions)	Value of work done (millions)	
		A	B	C	D	E	F	G	
2819	Industrial inorganic chemicals, n.e.c. -----	72.2	2 425.2	14.8	494.4	2.4	80.1	160.3	.20

¹Data excludes government-owned, contractor-operated plants.

²Establishments in selected industries were instructed to report number of employees, included in total employment, that were engaged in construction, maintenance, or repair of the plant and utilized as a separate work force. Coverage ratio (column H) indicates proportion of industry employment represented by establishments that reported construction employees. Coverage ratio excludes (a) construction workers not employed by establishment (working under contract or provided by another establishment of the company), (b) establishments that reported having no construction employees, (c) establishments that did not respond to inquiry, and (d) establishments that were not mailed a form or from which a form had not been received at the time data were tabulated.

APPENDIX A.

Explanation of Terms

This appendix is in two sections. Section 1 includes items requested of all establishments mailed census of manufactures forms including annual survey of manufactures (ASM) forms. Note that this section also includes several items (number of establishments and companies, value added, classes of products, and specialization and coverage ratios) not included on the report forms but derived from information collected on the forms. Section 2 covers supplementary items requested only from establishments included in the ASM sample. Results of the supplementary ASM inquiries are included in table 3c of this report.

SECTION 1. ITEMS COLLECTED OR DERIVED BASED ON ALL CENSUS OF MANUFACTURES (INCLUDING ASM) REPORT FORMS

Number of establishments and companies—As discussed in the Introduction, a separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

If the company operated at different physical locations, even if the individual locations were producing the same line of goods, a separate report was requested for each location. If the company operated in two or more distinct lines of manufacturing at the same location, a separate report was requested for each activity.

An establishment not in operation for any portion of the year was requested to return the report form with the proper notation in the "Operational Status" section of the form. In addition, the establishment was requested to report data on any employees, capital expenditures, inventories, or shipments from inventories during the year.

In this report, data are shown for establishments in operation at any time during the year. A comparison with the number of establishments in operation at the end of the year will be provided in the Introduction of the General Summary subject report.

Employment and related items—The report forms requested separate information on production workers for a specific payroll period within each quarter of the year and on other employees as of the payroll period which included the 12th of March.

All employees—This item includes all full-time and part-time employees on the payrolls of operating manufacturing establishments during any part of the pay period which included the 12th of the months specified on the report form. Included are all persons on paid sick leave, paid holidays, and paid vacations during these pay periods.

Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average for the payroll periods including the 12th of March, May, August, and November.

Production workers—This item includes workers (up through the line-supervisor level) engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial and guard services, product development, auxiliary production for plant's own use (e.g., power plant), recordkeeping, and other services closely associated with these production operations at the establishment covered by the report. Employees above the working-supervisor level are excluded from this item.

All other employees—This item covers nonproduction employees of the manufacturing establishment including those engaged in factory supervision above the line-supervisor level. It includes sales (including driver salespersons), sales delivery (highway truck drivers and their helpers), advertising, credit, collection, installation and servicing of own products, clerical and routine office function, executive, purchasing, financing, legal, personnel (including cafeteria, medical, etc.), professional, and technical employees. Also included are employees on the payroll of the manufacturing establishment engaged in the construction of major additions or alterations to the plant and utilized as a separate work force.

In addition to reports sent to operating manufacturing establishments, information on employment during the payroll period which included March 12 and annual payrolls also was requested of auxiliary units (e.g., administrative offices, warehouses, and research and development laboratories) of multiestablishment companies. However, these figures are not included in the totals for individual

industries shown in this report. They are included in the general summary and geographic area reports as a separate category.

Payroll—This item includes the gross earnings of all employees on the payroll of operating manufacturing establishments paid in the calendar year 1987. Respondents were told they could follow the definition of payrolls used for calculating the Federal withholding tax. It includes all forms of compensation, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. The total includes salaries of officers of corporations; it excludes payments to proprietors or partners of unincorporated concerns. Also excluded are payments to members of Armed Forces and pensioners carried on the active payroll of manufacturing establishments.

The census definition of payrolls is identical to that recommended to all Federal statistical agencies by the Office of Management and Budget. It should be noted that this definition does not include employers' Social Security contributions or other nonpayroll labor costs, such as employees' pension plans, group insurance premiums, and workers' compensation.

The ASM provides estimates of employers' supplemental labor costs, both those required by Federal and State laws and those incurred voluntarily or as part of collective bargaining agreements. (Supplemental labor costs are explained later in this appendix.)

As in the case of employment figures, the payrolls of separate auxiliary units of multiestablishment companies are not included in the totals for individual industries or industry groups.

Production-worker hours—This item covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave.

Cost of materials—This term refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuel consumed, whether purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (1) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year, (2) electric energy purchased, (3) fuels consumed for heat, power, or the generation of electricity, (4) work done by

others on materials or parts furnished by manufacturing establishments (contract work), and (5) products bought and resold in the same condition. (See discussion of duplication of data below.)

Specific materials consumed—In addition to the total cost of materials, which every establishment was required to report, information also was collected for most manufacturing industries on the consumption of major materials used in manufacturing. The inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers' records. Information on the establishments consuming less than a specified amount (usually \$10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which either administrative records or short forms were used was imputed as "not specified by kind." (See the introduction for the importance of administrative records in the industry.)

Value of shipments—This item covers the received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts, such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and resold without further processing. Included are all items made by or for the establishments from materials owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, including not only the direct cost of production but also a reasonable proportion of "all other costs" (including company overhead) and profit. (See discussion of duplication of data below.)

Individual products—As in previous censuses, data were collected for most industries on the quantity and value of individual products shipped. In the 1987 census program, information was collected on the output of approximately 11,000 individual product items. The term "product", as used in the census of manufactures, represents the finest level of detail for which output information was requested. Consequently, it is not necessarily synonymous with the term "product" as used in the marketing sense. In some cases, it may be much more detailed and, in other cases, it is more aggregative. For example, "pharmaceutical preparations" was distributed into over 100 terms; whereas, "motor gasoline" was reported as a single item.

Approximately 6,600 of the product items were listed separately on the 1987 census report forms. Data for

about 4,400 products were obtained in the monthly, quarterly, or annual surveys comprising the Current Industrial Reports series of the Census Bureau. Totals for the year 1987 for these items, as derived from the commodity surveys, are shown in the "products shipped" table (table 6a-2).

The list of products for which separate information was collected was prepared after consultation with industry and government representatives. Comparability with previous figures was given considerable weight in the selection of product categories so that comparable 1982 information is presented for most products.

Typically, both quantity and value of shipments information were collected. However, if quantity was not significant or could not be reported by manufacturers, only value of shipments was collected.

Shipments include both commercial shipments and transfers of products to other plants of the same company. For industries in which a considerable portion of the total shipments is transferred to other plants of the same company, separate information on interplant transfers also was collected. Moreover, for products that are used to a large degree within the same establishment as materials or components in the fabrication of other products, total production and often consumption of the item within the plant was collected. Typically, the information on production also was collected for products for which there are significant differences between total production and shipments in a given year because of wide fluctuations in finished goods inventories. Other measures of output of products with long production cycles were used as appropriate and feasible.

Classes of products—To summarize the product information, the separate products were aggregated into classes of products that, in turn, were grouped into all primary products of each industry. The code structure used is a seven-digit number for the individual product, a five-digit number for the class of product, and a four-digit number for the total primary products in an industry. (See Introduction, Industry Classification of Establishments, for application of the coding structure to the assignment of SIC codes for establishments.)

In the 1987 census, the 11,000 products were grouped into approximately 1,500 separate classes on the basis of general similarity of manufacturing processes, types of materials used, and the like. However, the grouping of products was affected by the economic significance of the class and, in some cases, dissimilar products were grouped because the products were not sufficiently significant to warrant separate classes.

Duplication in cost of materials and value of shipments—The aggregate of the cost of materials and value of shipments figures for industry groups and for all manufacturing industries includes large amounts of duplication since the products of some industries are used as materials by others. This duplication results, in part, from the

addition of related industries representing successive stages in the production of a finished manufactured product. Examples are the addition of flour mills to bakeries in the food group and the addition of pulp mills to paper mills in the paper and allied products group of industries. Estimates of the overall extent of this duplication indicate that the value of manufactured products exclusive of such duplication (the value of finished manufactures) tends to approximate two-thirds of the total value of products reported in the annual survey.

Duplication of products within individual industries is significant within a number of industry groups, e.g., machinery and transportation industries. These industries frequently include complete machinery and their parts. In this case, the parts made for original equipment are materials consumed for assembly plants in the same industry.

Even when no significant amount of duplication is involved, value of shipments figures are deficient as measures of the relative economic importance of individual manufacturing industries or geographic areas because of the wide variation in ratio of materials, labor, and other processing costs of value of shipments, both among industries and within the same industry.

Before 1962, cost of materials and value of shipments were not published for some industries which included considerable duplication. Since then, these data have been published for all industries at the United States level and beginning in 1964, for all geographic levels.

Value added by manufacture—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered). The result of this calculation is adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further manufacture, processing, or assembly) plus the net change in finished goods and work-in-process between the beginning- and end-of-year inventories.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1a), value added is adjusted only for the change in work-in-process inventories between the beginning and end of year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

"Value added" avoids the duplication in the figure for value of shipments that results from the use of products of some establishments as materials by others. Value added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

New and used capital expenditures—For establishments in operation and any known plants under construction, manufacturers were asked to report their new expenditures for (1) permanent additions and major alterations to

manufacturing establishments, and (2) machinery and equipment used for replacement and additions to plant capacity if they were of the type for which depreciation accounts were ordinarily maintained.

The totals for new expenditures include expenditures leased from nonmanufacturing concerns through capital leases, new facilities owned by the Federal Government but operated under contract by private companies, and plant and equipment furnished to the manufacturer by communities and nonprofit organizations. Also excluded are expenditures for used plant and equipment (although reported in the census), expenditures for land, and cost of maintenance and repairs charged as current operating expenses.

Manufacturers also were requested to report the value of all used buildings and equipment purchased during the year at the purchase price. For any equipment or structure transferred for the use of the reporting establishment by the parent company or one of its subsidiaries, the value at which it was transferred to the establishment was to be reported. Furthermore, if the establishment changed ownership during the year, the cost of the fixed assets (building and equipment) was to be reported under used capital expenditures.

Total expenditures for used plant and equipment is a universe figure; it is collected on all census forms. However, the breakdown of this figure between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form. The data for total new capital expenditures, new building expenditures, and new machinery expenditures, as well as the data for total used expenditures, are shown in table 3b.

End-of-year inventories—Respondents were asked to report their 1986 and 1987 end-of-year inventories at cost or market. Effective with the 1982 Economic Censuses, this change to a uniform instruction for reporting inventories was introduced for all sector reports. Prior to 1982, respondents were permitted to value inventories using any generally accepted accounting method (FIFO, LIFO, market, to name a few). In 1982, LIFO users were asked to first report inventory values prior to the LIFO adjustment and then to report the LIFO reserve and the LIFO value after adjustment for the reserve.

SECTION 2. ITEMS COLLECTED ONLY ON ASM REPORT FORMS

The following items were collected only from establishments included in the ASM sample:

1. **Supplemental labor costs**—Supplemental labor costs are divided into legally required expenditures and payments for voluntary programs. The legally required portion consists primarily of Federal old age and survivors' insurance, unemployment compensation, and workers' compensation. Payments for voluntary programs include all programs not

Because of this change in reporting instructions, the 1982 through 1987 data for inventories and value added by manufacture included in the tables of this report are not comparable to the prior-year data shown in table 1a of this report and in historical census of manufactures and annual survey of manufactures publications.

In using inventory data by stage of fabrication for "all industries" and at the two-digit industry level, it should be noted that an item treated as a finished product by an establishment in one industry may be reported as a raw material by another establishment in a different industry. For example, the finished-product inventories of a steel mill would be reported as raw materials by a stamping plant. Such differences are present in the inventory figures by stage of fabrication shown for individual industries, industry groups, and "all manufacturing", which are aggregates of figures reported by establishments in specified industries.

Specialization and coverage ratios—These items are not collected on the report forms but are derived from the data shown in table 5b. An establishment is classified in a particular industry if its shipments of primary products of that industry exceed in value its shipments of the products of any other single industry.

As noted in the introduction, an establishment's shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). Specialization and coverage ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in tables 1a through 5a and data on product shipments shown in tables 6a through 6c.

Specialization ratio represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments wherever classified.

specifically required by legislation whether they were employer initiated or the result of collective bargaining. They include the employer portion of such plans as insurance premiums, premiums for supplemental accident and sickness insurance, pension plans, supplemental unemployment compensation, welfare plans, stock purchase plans on which the employer payment is not subject to withholding tax, and deferred profit-sharing plans.

They exclude such items as company-operated cafeterias, in-plant medical services, free parking lots, discounts on employee purchases, and uniforms and work clothing for employees. While the excluded items do benefit employees and all or part of their cost generally is similar to the items covered in the ASM labor costs statistics, accounting records generally do not provide reliable figures on net employee benefits of these types.

2. **Retirements of depreciable assets**—Included in this item is the gross value of assets sold, retired, scrapped, destroyed, etc., during 1987. When a complete operation or establishment changed ownership, the respondent was instructed to report the value of the assets sold at the original cost as recorded in the books of the seller. The respondent also was requested to report retirements of equipment or structures owned by a parent company that the establishment was using as if it were a tenant.
3. **Depreciation charges for fixed assets**—This item includes depreciation and amortization charged during the year against assets. Depreciation charged against fixed assets acquired since the beginning of the year and against assets sold or retired during the year are components of this category. Respondents were requested to make certain that they did not report accumulated depreciation.
4. **Rental payments**—Total rental payments is collected on all census forms. However, the breakdown between rental payments for buildings and other structures and rental payments for machinery and equipment is collected only on the ASM forms. This item includes rental payments for the use of all items for which depreciation reserves would be maintained if they were owned by the establishment, e.g., structures and buildings, and production, office, and transportation equipment. Excluded are royalties and other payments for the use of intangibles and depletable assets, and land rents where separable.

When an establishment of a multiestablishment company was charged rent by another part of the same company for the use of assets owned by the company, it was instructed to exclude that cost from rental payments. However, the book value (original cost) of these company-owned assets was to be reported as assets of the establishment at the end of the year.

If there were assets at an establishment rented from another company and the rents were paid centrally by the head office of the establishment, the company was instructed to report these rental payments as if they were paid directly by the establishment.

5. **Depreciable assets**—Total value of gross depreciable assets is collected on all census forms.

However, the detail for depreciable assets is collected only on the ASM forms. The data encompass all fixed depreciable assets on the books of establishments at the beginning and end of the year. The values shown (book value) represent the actual cost of assets at the time they were acquired, including all costs incurred in making the assets usable (such as transportation and installation). Included are all buildings, structures, machinery, and equipment (production, office, and transportation equipment) for which depreciation reserves are maintained. Excluded are nondepreciable capital assets, including inventories and intangible assets, such as timber and mineral rights.

The definition of fixed depreciable assets is consistent with the definition of capital expenditures. For example, expenditures include actual capital outlays during the year, rather than the final value of equipment put in place and buildings completed during the year. Accordingly, the value of assets at the end of the year includes the value of construction in progress. In addition, respondents were requested to make certain that assets at the beginning of the year plus new and used capital expenditures, less retirements, equalled assets at the end of the year.

6. **New and used capital expenditures**—The data for total new capital expenditures, new building expenditures, new machinery expenditures, and total used capital expenditures are collected on all census forms. However, the breakdown between expenditures for used buildings and other structures and expenditures for used machinery and equipment is collected only on the ASM form. (See further explanation on capital expenditures in section 1.)
7. **Quantity of electric energy consumed for heat and power**—Data on the cost of purchased electric energy were collected on all census forms. However, data on the quantity of purchased electric energy were collected only on the ASM forms. In addition, information was collected on the quantity of electric energy generated by the establishment and the quantity of electric energy sold or transferred to other plants of the same company.
8. **Breakdown of new capital expenditures for machinery and equipment**—ASM establishments were requested to separate their capital expenditures for new machinery and equipment into (1) automobiles, trucks, etc., for highway use, (2) computers and peripheral data processing equipment, and (3) all other.

The category "automobiles, trucks, etc., for highway use" is intended to measure expenditures for vehicles designed for highway use that were acquired through a purchase or lease-purchase agreement.

Vehicles normally operating off public highways (vehicles specifically designed to transport materials, property, or equipment on mining, construction, logging, and petroleum development projects) are excluded from this item.

9. **Foreign content of cost of materials**—Establishments included in the ASM sample panel were requested to provide information on foreign-made materials purchased or transferred from foreign sources. This includes materials acquired from a central warehouse or other domestic establishment of the same company but made in an operation outside of the 50 States, District of Columbia, Puerto Rico, or U.S. territories.
10. **Cost of purchased services**—ASM establishments were requested to provide information on the cost of purchased services for the repair of buildings and other structures, the repair of machinery, and communication services. Included in the cost of purchased services for the repair of buildings and machinery are payments made for all maintenance and repair work on buildings and equipment, such as painting, roof repairs, replacing parts, and overhauling equipment. Such payments made to other establishments of the same company and for repair and maintenance of any leased property also are included. Extensive repairs or reconstruction that were capitalized are considered capital expenditures for used buildings and machinery and are, therefore, excluded from this item. Repair and maintenance costs provided by an owner as part of a rental contract or incurred directly by an establishment in using its own work force also are excluded.

Three basic approaches were utilized to produce these statistics.

1. For items 1 through 6, data were estimated (imputed) for all non-ASM establishments using the available data in the establishment record and industry-based parameters. The statistics were then generated by simply tabulating all census records including the imputed value for non-ASM establishments and the unweighted value for ASM establishments. Separate imputation rates were developed and are shown in the table. For quantity of purchased electricity for heat and power (item 7), a similar procedure was used; however, the imputation parameters were geographically-based instead of industry-based. For quantities of generated less sold electricity, no imputation was performed for non-ASM establishments. The estimates for these items are simply tabulations of unweighted ASM values.

Since the published statistics for these items were developed from the complete census universe and not just the ASM establishments, there are no sampling variances associated with these statistics. However, there is an unknown level of bias for each of the items due to the imputation of the non-ASM establishments. This bias is felt to be small due to the strong correlation between the items being imputed and the collected items that were used to generate the impute values.

2. For items 8 and 9, the estimates were developed using a ratio estimation methodology. For item 8, an estimate of the breakout of new capital expenditures for machinery and equipment into the three categories was made from ASM establishments reporting these categories. The estimated proportions were then applied to the corresponding Census value for new capital expenditures for machinery and equipment to produce the estimates.

The estimates for item 9, foreign content of cost of materials, were developed in a similar manner based on costs of parts, supplies, and components (item 5a) as the control total for the three categories.

For items 8 and 9, an adjustment ratio of the following form was computed.

$$R_j = \frac{NM_c}{TME_{asm}}$$

where:

NM_c = the census value of new capital expenditures for machinery and equipment

TME_{asm} = the weighted ASM value of new capital expenditures for machinery and equipment from reporters of the detailed breakout data

3. For item 10, cost of purchased services, the estimates were made by simply tabulating weighted data for all the ASM records that reported the item. A response coverage ratio (a measure of the extent to which respondents reported for each item) is shown in table 3c for the three types of services. It is derived for each item by calculating the ratio of the weighted employment (establishment data multiplied by sample weight, see appendix B) for those ASM establishments that reported the specific inquiry to the weighted total employment for all ASM establishments classified in the industry.

APPENDIX B.

Annual Survey of Manufactures (ASM) Sampling and Estimating Methodologies

DESCRIPTION OF SURVEY SAMPLE

The Annual Survey of Manufactures (ASM) contains two components. The mail portion of the survey is a probability sample of about 56,000 manufacturing establishments selected from a total of about 220,000 establishments. These 220,000 establishments represent all manufacturing establishments of multiunit companies and all single establishment companies mailed schedules in the 1982 Census of Manufactures. This mail portion is supplemented annually by a Social Security Administration list of new manufacturing establishments opened after 1982 and a list of new multiunit manufacturing establishments identified from the Census Bureau's Company Organization Survey.

The 1984 through 1988 ASM sample differs slightly from the previous sample. For the current panel, all establishments of companies with 1982 shipments in manufacturing in excess of \$500 million were included in the survey panel with certainty. There are approximately 500 such companies collectively accounting for approximately 18,000 establishments. For the remaining portion of the mail survey, the establishment was defined as the sampling unit. For this portion, all establishments with 250 employees or more and establishments with a very large value of shipments also were included in the survey panel with certainty. A total of 12,100 establishments were selected from this portion of the universe with certainty. Therefore, of the 56,000 manufacturing establishments included in the ASM panel, approximately 31,000 are selected with certainty. These certainty establishments collectively account for approximately 80 percent of the total value of shipments in the 1982 census.

Smaller establishments in the remaining portion of the mail survey were sampled with probabilities ranging from 0.999 to 0.005 in accordance with mathematical theory for optimum allocation of a sample. The probabilities of selection assigned to the smaller establishments were proportional to measures of size determined for each establishment. The measures of size depend directly upon each establishment's 1982 product class values and the historic variability of the year-to-year shipments of each product class. Product classes displaying more volatile year-to-year change in shipments at the establishment level were sampled at a heavier rate.

This method of assigning measures of size was used in order to maximize the precision (that is, minimize the variance of estimates of the year-to-year change) in the value of product class shipments. Implicitly, it also gave weight differences in employment, value added, and other

general statistics, since these are highly correlated with value of shipments. Individual sample selection probabilities were obtained by multiplying each establishment's final measure of size by an overall sampling fraction coefficient calculated to yield a total expected sample size.

The sample selection procedure gave each establishment in the sampling frame an independent chance of selection. This method of independent selection permits the rotation of small establishments out of a given sample panel without introducing a bias into the survey estimates.

The nonmail portion of the survey includes all single-establishment companies that were tabulated as administrative records in the 1982 Census of Manufactures. Although this portion contained approximately 130,000 establishments, it accounted for less than 2 percent of the estimate for total value of shipments at the total manufacturing level. This portion was not sampled; rather, the data for every establishment in this group were estimated based on selected information obtained annually from the administrative records of the Internal Revenue Service and the Social Security Administration. This administrative-record information, which includes payroll, total employment, industry classification, and physical location of the establishment, was obtained under conditions which safeguard the confidentiality of both tax and census records. Estimates of data other than payroll and employment for these small establishments were developed from industry averages.

The corresponding estimates for the mail and nonmail establishments were added together, along with the base-year differences, as defined in the Description of Estimating Procedure section, to produce the figures shown in this publication.

DESCRIPTION OF ESTIMATING PROCEDURES

Most of the ASM estimates for the years 1983-1986 were computed using a difference estimation procedure. For each item, a base-year difference was developed. This base-year difference is equal to the difference between the 1982 census published number for an item total and the linear ASM estimate of the total for 1982. The ASM linear estimate was obtained by multiplying each sample establishment's data by its sample weight (the reciprocal of its probability of selection) and summing the weighted values.

These base-year differences were then added to the corresponding current-year linear estimates, which include the sum of the estimates for the mail and nonmail establishments, to produce the estimates for the years 1983-1986. Estimates developed by this procedure usually are far more reliable than comparable linear estimates developed from the current sample data alone.

The 1987 sample estimates for the purchased service items, shown in table 3c, are strictly ASM linear estimates, however, developed only from ASM establishments that reported the specific item.

The remaining estimates in table 3c, showing the breakdown of expenditures for new machinery and equipment and costs of parts (separated into purchases from foreign sources and purchases from domestic sources), were computed as ratio estimates. To do this, linear estimates of the new machinery detail items were developed from the ASM establishments and were ratio adjusted to the corresponding census total for new machinery. In a similar fashion, the ASM linear estimates of the detailed purchased materials items were ratio adjusted to the corresponding census total for cost of parts.

QUALIFICATIONS OF THE DATA

The estimates developed from the sample are apt to differ somewhat from the results of a survey covering all companies in the sampled lists but otherwise conducted under essentially the same conditions as the actual sample survey. The estimates of the magnitude of the sampling errors (the differences between the estimates obtained and the results theoretically obtained from a comparable, complete-coverage survey) are provided by the standard errors of the estimates.

The particular sample selected for the ASM is one of a large number of similar probability samples that, by chance, might have been selected under the same specifications. Each of the possible samples would yield somewhat different sets of results, and the standard errors are measures of the variation of all the possible sample estimates around the theoretical, comparable, complete-coverage values.

Estimates of the standard errors have been computed from the sample data for selected statistics in this report. They are presented in the form of relative standard errors (the standard errors divided by the estimated values to which they refer).

In conjunction with its associated estimate, the relative standard error may be used to define confidence intervals (ranges that would include the comparable, complete-coverage value for specified percentages of all the possible samples).

The complete coverage value would be included in the range:

1. From one standard error below to one standard error above the derived estimate for about two-thirds of all possible samples.
2. From two standard errors below to two standard errors above the derived estimate for about 19 of 20 of all possible samples.
3. From three standard errors below to three standard errors above the derived estimate for nearly all samples.

An inference that the comparable, complete-survey result would be within the indicated ranges would be correct in approximately the relative frequencies shown. Those proportions, therefore, may be interpreted as defining the confidence that the estimates from a particular sample would differ from complete-coverage results by as much as one, two, or three standard errors, respectively.

For example, suppose an estimated total is shown as 50,000 with an associated relative standard error of 2 percent, that is, a standard error of 1,000 (2 percent of 50,000). There is approximately 67 percent confidence that the interval 49,000 to 51,000 includes the complete-coverage total, about 95 percent confidence that the interval 48,000 to 52,000 includes the complete-coverage total and almost certain confidence that the interval 47,000 to 53,000 includes the complete coverage total.

In addition to the sample errors, the estimates are subject to various response and operational errors: errors of collection, reporting, coding, transcription, imputation for nonresponse, etc. These operational errors also would occur if a complete canvass were to be conducted under the same conditions as the survey. Explicit measures of their effects generally are not available. However, it is believed that most of the important operational errors were detected and corrected in the course of the Bureau's review of the data for reasonableness and consistency. The small operational errors usually remain. To some extent, they are compensating in the aggregated totals shown. When important operational errors were detected too late to correct the estimates, the data were suppressed or were specifically qualified in the tables.

As derived, the estimated standard errors included part of the effect of the operational errors. The total errors, which depend upon the joint effect of the sampling and operational errors, are usually of the order of size indicated by the standard error, or only moderately higher. However, for particular estimates, the total error may considerably exceed the standard errors shown.

The concept of complete coverage under the conditions prevailing for the ASM is not identical to the complete coverage of the census of manufactures, as the censuses have been conducted. Nearly all types of operational errors that affect the ASM also occur in the censuses. The ASM and the censuses, are conducted under quite different conditions, and operational errors can be better controlled in the ASM than in the censuses. As a result, for many of the census figures, the errors are of the same order of size as the total errors of the corresponding annual survey estimates. The differences between the census and ASM operating conditions also disturb, to some degree, the comparability of the ASM and census data.

Any figures shown in the tables in this publication having an associated standard error exceeding 15 percent may be of limited reliability. However, the figure may be combined with higher-level totals, creating a broader aggregate, which then may be of acceptable reliability.

APPENDIX C.

Changes in Census of Manufactures Product Classes for 1987

[Based on revisions to the Standard Industrial Classification (SIC) Manual definitions of some product classes were revised for 1987. Listed below are the revisions to the product classes]

1987	1982	1987	1982	1987	1982	1987	1982
2011B	2011A 2013A pt	20866—Con.	20861 pt—Con. 20995 pt	2221F—Con.	22211 pt—Con. 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	23259—Con.	23279—Con. 23289 pt
20135	20130	20910	20324 pt 20910			23260	23280
2013B	2013A pt	20925 20926	20924			23261	23281
20150	20160 20170	20961 20962 20963	20992	2221G	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	23262	23284
20151	20161 20171	20980	20981 pt			23269	23289 pt
20152	20162 20172	20997	20341 pt 20440 pt 20982 2099A pt	2221H	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	23293	23271 pt 23292
20153	20163 20173	20999	2099B pt			23530	23510 pt 23520
20154	20164 20174	2099D	20995 pt	2221J	22218	23531	23521
20155	20165 20175	2099E 2099F 2099G	2099C 20981 pt	2221K	22219	23532	23522
20226	20220	2211B	22111 pt 22112 pt 22113 pt 22114 pt 22115 pt 22116 pt	2221M	2221A	23533	23510 pt
20239	20239 2099A pt	2211C	22111 pt 22112 pt 22113 pt 22114 pt 22115 pt 22116 pt	22510	22510 pt	23692	23631
20267	20266 pt 2099B pt	2211D	22111 pt 22112 pt 22113 pt 22114 pt 22115 pt 22116 pt	22514	22512 pt	23693	23691
20268	20266 pt 2099B pt	2211E	22111 pt 22112 pt 22113 pt 22114 pt 22115 pt 22116 pt	22518	22517 pt	23699	23619 23699
20324	20324 pt	2211F	22117	22520	22510 pt 22520	23813	23811 pt 23812 pt
20343	20341 pt	2211G	22119	22525	22512 pt 22523	23814	23811 pt 23812 pt
20380	20380 pt	2211H	2211A	22526	22517 pt 22524	23952	23951 pt
20384	20381 pt 20383 pt	2211I	22111 pt 22112 pt 22113 pt 22114 pt 22115 pt 22116 pt	22585	22920 pt	23958	23959
20415	20383 pt 20415	2221B	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	22589	22589 22920 pt	23964	23951 pt
20440	20440 pt	2221C	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	22730	22710 pt 22720 pt 22790 pt	24930	24920 pt 26610
20450	20383 pt 20450	2221D	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	22731	22710 pt	24931	24920 pt
20470	20470 pt	2221E	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	22732	22720 pt	24932	24920 pt
20480	20470 pt 20480	2221F	22217	22733	22790 pt	24933	24993
2048A	20475 20476	2221G	22219			24934	24996
20530	20380 pt 20381 pt	2221H	2221A			24935	26611
20640	20650 pt	2221I	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	22815	22833	24936	24998
20642	20652	2221J	22218	22822	22822 22830	24937	24995
20643	20653	2221K	22219	22991	22910	24994	2499A pt
20649	20659	2221L	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	22994	22940	25115	25115 25158
20660	20660 20990 pt	2221M	2221A	22995	22930	25145	25141 25142
20669	20668 20998	2221N	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	22996	22992 22993	25146	25143
20680	20341 pt 20650 pt 20657	2221O	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	23219	23219 pt	25147	25144
20863 20864 20865	20861 pt	2221P	22211 pt 22212 pt 22213 pt 22214 pt 22215 pt 22216 pt 22217 pt	23221	23220	25425 25991 25992 25994	25990
20866	20861 pt 20862	2221Q	22211 pt	23222	23215	2621B	26612
		2221R	22211 pt	23229	23219 pt 23229	26560	26540
		2221S	22211 pt	23250	23270	26561	26541
		2221T	22211 pt	23251	23271 pt	26562	26542
		2221U	22211 pt	23252	23283	26563	26545
		2221V	22211 pt	23259	23279	26570	26510 26544

[Based on revisions to the Standard Industrial Classification (SIC) Manual definitions of some product classes were revised for 1987. Listed below are the revisions to the product classes]

1987	1982	1987	1982	1987	1982	1987	1982
26710	26410 pt	26753	26455	27591	27511 pt	28350—Con. 28351 28352	2831A—Con.
26711	26415	26760	26470	27592	27512 pt		
26712	26416	26761	26471	27593	27513 pt	28360	28310
26713	26419	26763	26473	27594	27514 pt	28361	28311
26714	2641A	26764	26474	27595	27515 pt	28362	28312
26720	26410 pt	26770	26420	27596	27516 pt	28363	28317
26721	26411	26780	26480	27597	27511 pt 27512 pt 27513 pt 27514 pt 27515 pt 27516 pt	28364	28318 28319
26722	26413	26781	26481			28656	2911C
26723	26414	26782	26482			28691	2911B
26724	2641B	26790	26460 pt 26490	27598	27519	28916 28917	28915
26730	26430 pt	26791	26493	27599	27531		
26731	26435	26792	26494	2759A	27510 pt	2911D	2911D pt
26732	26436	26793	26496	27960	27530 27950	29990	2911D pt 29990
26733	26437	26794	26460 pt	27961	27951 35557 pt	31430	31430 31433 31434 31435
26740	26430 pt	26795	26497	27962	27952		
26741	26434	27416 27417	27411	27963	27532 27547 27930 27940	31440	31440 31445 31446 31447 31448
26742	26438	27418	27412				
26750	26450	27419	27414	28247	28243 28245	31490	31490 31491 31493 31495 31496 31497
26751	26453	2741A 2741B	27415	28248	28246		
26752	26454	27590	27510 pt	28350	2831A		

APPENDIX D.

Changes in Census of Manufactures Product Codes for 1987

[Based on revisions to the Standard Industrial Classification (SIC) Manual, definitions of some product codes were revised for 1987. Listed below are the revisions to the product codes. The terms published and collected are defined as follows: (1) published refers to the code used in the published reports for 1987 and 1982, and (2) collected refers to the code appearing on the report forms for 1987]

1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
20119 14	20119 14	20119 12 20119 13	20159 17	20179 17	20179 17	20343 21	20341 21	20341 21	20488 21	20488 21	20488 18
2011B 15	2011B 15	2011A 15	20159 51	20179 51	20179 51	20343 23	20341 23	20341 23	20488 23	20488 23	20488 17 pt
2011B 41	2011B 41	2011A 41	20159 53	20179 53	20179 53	20343 29	20341 29	20341 29	20488 25	20488 25	20488 19 pt
2011B 55	2011B 55	2011A 55	20159 55	20179 55	20179 55	20343 31	20341 31	20341 32 20341 33 20341 35	20488 31	20488 31	20488 17 pt
2011B 99	2011B 99	2011A 31 2011A 51	20159 57	20179 57	20179 57	20352 31 20352 34	20352 31 20352 34	20352 33	20488 33	20488 33	20488 19 pt
20135 13 20135 17	20135 13 20135 17	20130 00	20226 00	20220 11	20220 00	20352 35	20354 35	20354 31 20354 33 20354 39	2048A 01	20475 35	20475 35
20151 33	20161 33	20161 33	20235 22	20235 22	20235 28 pt	20235 29	20235 29	20235 21 20235 28 pt	2048A 03	20475 52	20475 52
20151 34	20161 34	20161 34	20235 29	20235 29	20235 28 pt	20239 23	20239 23	20239 29 pt	2048A 05	20476 61	20476 61
20151 36	20161 36	20161 36	20239 23	20239 23	20239 29 pt	20239 25	2099A 12	2099A 11 pt	2048A 07	20476 63	20476 63
20151 39	20161 39 20171 39	20161 39 20171 39	20239 25	20239 25	20239 29 pt	20239 28	20239 28	20239 29 pt	2048A 09	20476 65	20476 65
20151 41	20161 41 20171 41	20161 41 20171 41	20239 28	20239 28	20239 29 pt	20239 32 20239 38	20239 32 20239 38	20239 31	2048A 11	20476 67	20476 67
20152 21	20162 21 20172 21	20162 21 20172 21	20239 32 20239 38	20239 32 20239 38	20239 31	20239 37 20239 39	20239 37 20239 39	20239 31	2048A 13	20476 69	20476 69
20152 23	20162 23 20172 23	20162 23 20172 23	20239 38	20239 38	20239 31	20240 31	20240 31	20240 98 pt	20512 39 20512 40 20512 42	20512 39 20512 40 20512 42	20512 38
20153 22	20163 22 20173 22	20163 21 pt 20173 21 pt	20240 31	20240 31	20240 98 pt	20240 52 20240 54	20240 52 20240 54	20240 51	20530 11	20381 11	20381 11
20153 24	20163 24 20173 24	20163 23 pt 20173 23 pt	20240 52 20240 54	20240 52 20240 54	20240 51	20240 99	20240 99	20240 98 pt	20530 13	20381 13	20381 13
20153 26	20163 26 20173 26	20163 25 pt 20173 25 pt	20240 99	20240 99	20240 98 pt	20267 11	2099B 11	2099B 11	20530 14	20381 14	20381 14
20153 27	20163 27 20173 27	20163 21 pt 20163 23 pt 20163 25 pt 20173 21 pt 20173 23 pt 20173 25 pt	20267 11	2099B 11	2099B 11	20267 13	2099B 13	2099B 13	20530 17	20381 17	20381 17
20154 14	20164 14 20174 14	20164 14 20174 14	20267 14 20267 16	2099B 14 2099B 16	2099B 19 pt	20267 17	20267 17	20266 17	20530 19	20381 19	20381 19
20154 16	20164 16 20174 16	20164 16 20174 16	20267 18	2099B 18	2099B 19 pt	20268 13	2099B 51	2099B 51	20642 00	20652 00	20652 00
20155 11	20165 11 20175 11	20165 11 20175 11	20268 13	2099B 51	2099B 51	20268 15	20268 15	20266 15	20643 00	20653 00	20653 00
20155 13	20165 13 20175 13	20165 13 20175 13	20268 19	20268 19	20266 19	20324 97 20324 99	20324 97 20324 99	20324 98	20649 21	20659 21	20659 21
20155 15	20165 15 20175 15	20165 15 20175 15	20324 97 20324 99	20324 97 20324 99	20324 98	20331 13	20331 13	20331 71	20649 76	20659 76	20659 76
20155 31	20165 31 20175 31	20165 31 20175 31	20331 13	20331 13	20331 71	20331 32	20331 32	20331 72	20669 11	20668 11 20998 11	20668 11 20998 11
20155 32	20165 32 20175 32	20165 32 20175 32	20331 32	20331 32	20331 72	20331 36	20331 36	20331 73	20669 21	20659 21	20659 21
20155 33	20165 33 20175 33	20165 33 20175 33	20331 36	20331 36	20331 73	20331 38	20331 38	20331 74	20669 71	20668 71 20998 71	20669 71 20998 71
20155 34	20165 34 20175 34	20165 34 20175 34	20331 38	20331 38	20331 74	20331 41	20331 41	20331 75	20669 75	20668 75 20998 75	20669 75 20998 75
20155 39	20165 39 20175 39	20165 39 20175 39	20331 41	20331 41	20331 75	20332 05	20332 05	20332 08 20332 09 20332 92	20669 81	20668 81	20668 81
20155 48	20165 48 20175 48	20165 48 20175 48	20332 05	20332 05	20332 08 20332 09 20332 92	20332 37	20332 37	20332 96	20669 81	20668 81	20668 81
20159 11	20179 11	20179 11	20332 37	20332 37	20332 96	20336 14	20336 14	20336 13	20669 92	20668 92 20998 92	20668 92 20998 92
20159 13	20179 13	20179 13	20336 14	20336 14	20336 13	20483 01 20483 02	20483 01 20483 02	20483 00	20669 93	20668 93 20998 93	20668 93 20998 93
20159 15	20179 15	20179 15	20483 01 20483 02	20483 01 20483 02	20483 00	20485 03 20485 04	20485 03 20485 04	20485 00	20669 95	20668 95 20998 95	20668 95 20998 95
			20485 03 20485 04	20485 03 20485 04	20485 00	20488 11	20488 11	20488 14	20670 11 20670 14	20670 11 20670 14	20670 12
			20488 11	20488 11	20488 14	20488 12 20488 13	20488 12 20488 13	20488 15	20680 13	20657 13	20657 13
			20488 12 20488 13	20488 12 20488 13	20488 15	20487 05 20487 06	20487 05 20487 06	20487 00	20680 15	20657 15	20657 15
			20487 05 20487 06	20487 05 20487 06	20487 00	20343 13	20341 13	20341 13	20680 17	20657 17	20657 17
			20343 13	20341 13	20341 13	20343 15	20341 15	20341 15	20680 33	20657 33	20657 33
			20343 15	20341 15	20341 15	20343 18	20341 18	20341 18	20680 35	20657 35	20657 35
			20343 18	20341 18	20341 18						

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1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published	1987 published	1987 collected	1982 published
2221C 00— Con.	2221C 00— Con.	22214 00 pt —Con. 22217 10 pt 22217 30 pt	22514 37	22512 37	22512 37	22840 51	22840 51	22840 15 pt 22840 28 pt	23531 01	23521 15	23521 15
			22514 39	22512 39	22512 36 22512 38	22840 61	22840 61	22840 35	23531 03	23521 41	23521 41
2221D 00	2221D 00	22211 00 pt 22212 00 pt 22213 00 pt 22214 00 pt 22215 00 pt 22216 00 pt 22217 10 pt 22217 30 pt	22514 45	22512 45	22512 45	22950 00 22950 98	22950 00 22950 98	22950 00	23531 05	23521 83	23521 83
			22518 14	22517 14	22517 15 pt				23531 09	23521 91	23521 91
			22518 17	22517 17	22517 17	22991 00	22910 00 pt	22910 00 pt	23532 01	23522 12	23522 12
			22525 11	22523 11	22523 11	22991 12 22991 13	22910 12 22910 13	22910 11	23532 03	23522 15	23522 15
2221E 00	2221E 00	22211 00 pt 22212 00 pt 22213 00 pt 22214 00 pt 22215 00 pt 22216 00 pt 22217 10 pt 22217 30 pt	22525 15	22512 11	22512 11	22991 15 22991 17	22910 15 22910 17	22910 19	23532 05	23522 17	23522 17
			22525 17	22523 17	22523 17				23532 09	23522 98	23522 98
			22525 21	22523 21	22523 21	22991 21 22991 23	22910 21 22910 23	22910 00	23533 01	23510 12	23510 12
			22525 27	22523 27	22523 27	22991 35	22910 35	22910 36 22910 38	23533 03	23510 41	23510 41
2221F 00	2221F 00	22211 00 pt 22212 00 pt 22213 00 pt 22214 00 pt 22215 00 pt 22216 00 pt 22217 10 pt 22217 30 pt	22525 31	22523 31	22523 31	22991 47	22910 47	22910 47	23533 09	23510 93	23510 93
			22525 51	22523 51	22523 51	22994 22	22940 22	22940 14 pt 22940 21 pt	23613 00	23613 00	23611 30 pt 23612 00
			22525 57	22523 57	22523 57				23614 00	23614 00	23611 30 pt
			22525 61	22523 61	22523 61	22994 31	22940 31	22940 14 pt 22940 21 pt	23615 00	23615 00	23611 10
2221H 10	2221H 10	22211 00 pt 22212 00 pt 22213 00 pt 22214 00 pt 22215 00 pt 22216 00 pt 22217 10 pt 22217 30 pt	22525 81	22523 81	22523 81	22994 35	22940 35	22940 14 pt 22940 21 pt	23692 00	23631 00	23631 00
			22526 25	22524 25	22524 25				23693 40	23691 40	23691 40
			22526 42	22517 13 22524 41	22517 15 pt 22524 41	22994 39	22940 39	22940 14 pt 22940 28	23693 70	23693 70	23691 70
			22526 51	22524 51	22524 51	22994 41	22940 41	22940 41	23693 80 23693 93	23691 80 23691 93	23691 92
2221H 20	2221H 20	22211 00 pt 22212 00 pt 22213 00 pt 22214 00 pt 22215 00 pt 22216 00 pt 22217 10 pt 22217 30 pt	22585 00	22920 00	22920 00	22995 17	22930 17	22930 17	23813 00	23813 00	23811 00 pt 23812 00 pt
			22617 00	22617 00	22617 11 22617 31 22617 51 22617 61	22995 19	22930 19	22930 19	23814 00	23814 00	23811 00 pt 23812 00 pt
			22619 00	22619 00	22619 11 22619 31 22619 51 22619 71	22995 32	22930 32	22930 32	23910 10	23910 10	23910 11 pt 23910 17 pt 23910 18 pt 23910 51 pt 23910 57 pt 23910 58 pt
2221J 00	2221J 00	22218 00 22218 15 22218 25 22218 35 22218 38 22218 55 22218 58 22218 64 22218 67	22628 00	22628 00	22628 20 22628 30 22628 50 22628 61	22996 01	22996 01	22992 61	23910 12	23910 12	23910 11 pt
			22629 00	22629 00	22629 20 22629 30 22629 50 22629 61	22996 03	22996 03	22992 75	23910 19 23910 21	23910 19 23910 21	23910 17
			22629 00	22629 00	22629 20 22629 30 22629 50 22629 61	22996 10	22996 10	22993 40	23910 25	23910 25	23910 18 pt
2221K 00	2221K 00	22219 15 22219 25	22629 00	22629 00	22629 20 22629 30 22629 50 22629 61	22996 11	22996 11	22993 50	23910 25	23910 25	23910 18 pt
2221M 21	2221M 21	2221A 21 2221A 22	22731 00	22710 00	22710 00	23213 00	23213 00	23212 00 23214 00 pt	23910 52	23910 52	23910 51 pt
2221M 23	2221M 23	2221M 23 2221M 24	22732 20	22720 20	22720 20	23216 00	23216 00	23214 00 pt	23910 59 23910 61	23910 59 23910 61	23910 57
2221M 25	2221M 25	2221A 25 2221A 26	22732 40	22720 40	22720 40	23222 00	23215 00	23215 00	23910 62	23910 62	23910 58 pt
2221M 27	2221M 27	2221A 27 2221A 28	22733 00	22790 00	22790 00	23229 11	23229 93	93000 00	23921 11	23921 11	23921 12 pt 23921 13 pt 23921 15 pt 23921 17 pt 23921 18 pt 23921 19 pt 23921 27 pt 23921 28 pt 23921 29 pt
2221M 33	2221M 33	2221A 33 2221A 37	22815 20	22833 20	22833 20	23229 12	23219 15	23219 15	23921 11	23921 11	23921 12 pt 23921 13 pt 23921 15 pt 23921 17 pt 23921 18 pt 23921 19 pt 23921 27 pt 23921 28 pt 23921 29 pt
2221M 41	2221M 41	2221A 41 2221A 44	22822 21 22822 31	22822 21 22822 31	22822 00	23251 00	23271 11	23271 00	23921 14	23921 14	23921 12 pt
2221M 42	2221M 42	2221A 42 2221A 45	22823 11	22823 11	22823 27 pt 22823 32 pt 22823 35 pt	23252 00	23283 00	23283 00	23921 14	23921 14	23921 12 pt
2221M 43	2221M 43	2221A 43 2221A 46	22823 13	22823 13	22823 27 pt 22823 32 pt 22823 35 pt	23259 11	23279 13	23279 00 pt	23921 16	23921 16	23921 13 pt 23921 15 pt
2221M 47	2221M 47	2221A 47 2221A 48	22823 15	22823 15	22823 27 pt 22823 32 pt 22823 35 pt	23260 00	23289 13	23289 13	23921 20	23921 20	23921 17 pt
2221M 71	2221M 71	2221A 71 pt 2221A 72 pt	22840 31	22840 31	22840 15 pt	23269 00	23289 13	23289 13	23921 21	23921 21	23921 18 pt 23921 19 pt
2221M 77	2221M 77	2221A 71 pt 2221A 72 pt	22840 33	22840 33	22840 28 pt	23299 11	23279 11	23279 00 pt	23921 24	23921 24	23921 23 23921 25
22514 17	22512 17	22512 17	22840 41	22840 41	22840 15 pt	23299 13	23299 93	93000 00	23921 30	23921 30	23921 27 pt
22514 21	22512 21	22512 21	22840 43	22840 43	22840 28 pt	23314 00	23314 00	23317 00 pt	23921 31	23921 31	23921 28 pt 23921 29 pt
						23413 00	23413 00	23413 30 23413 31	23923 10 23923 13	23923 10 23923 13	23923 00

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23924 12	23924 12	23924 11 pt 23924 13 pt 23924 39 pt	24112 28	24112 28	24112 11 24112 15 24112 20 24112 22 24112 27 pt	24363 98	24363 98	24363 01 pt 24363 03 pt	24994 14— Con. 24994 16	24994 14— Con. 24994 16	24994 13 pt —Con. 24994 15 pt
23924 14	23924 14	23924 11 pt 23924 13 pt 23924 39 pt	24113 11 24113 13	24113 11 24113 13	24113 00	24367 00	24367 00	24367 01 24367 03	24994 17	24994 17	24994 17
23924 16	23924 16	23924 11 pt 23924 13 pt 23924 39 pt	24114 08 24114 10	24114 08 24114 10	24114 11	24411 27	24411 27	24411 25 24411 51	24994 19	24994 19	24994 19
23924 33	23924 33	23924 31 pt 23924 39 pt	24114 12 24114 14	24114 12 24114 14	24114 13	24411 63	24411 63	24411 65 24411 83	24994 23	24994 23	24994 23
23924 35	23924 35	23924 31 pt 23924 39	24114 16	24114 16	24114 17 pt	24522 17 24522 19	24522 17 24522 19	24522 21	24994 25	24994 25	24994 25
23924 36	23924 36		24114 18	24114 18	24114 19 pt	24912 01 24912 03 24912 05 24912 07	24912 01 24912 03 24912 05 24912 07	24912 11	24994 41	24994 41	24994 41
23924 37	23924 37	23924 44 pt 23924 45 pt 23924 47 pt 23924 49 pt	24114 22 24114 24	24114 22 24114 24	24114 17 pt 24114 19 pt	24912 09 24912 12 24912 14 24912 16	24912 09 24912 12 24912 14 24912 16	24912 13	24994 51	24994 51	24994 51
23924 38	23924 38	23924 44 pt 23924 45 pt	24114 29 24114 33 24114 35	24114 29 24114 33 24114 35	24114 31	24912 17 24912 19	24912 17 24912 19	24912 21	24994 41	24994 41	24994 41
23924 40	23924 40	23924 47 pt 23924 49 pt	24211 61 24211 63 24211 65	24211 61 24211 63 24211 65	24211 71	24913 01 24913 03	24913 01 24913 03	24913 11	24994 51	24994 51	24994 51
23924 41	23924 41	23924 41 23924 44 pt 23924 45 pt	24211 75 24211 77	24211 75 24211 77	24211 73	24912 01 24912 03 24912 05 24912 07	24912 01 24912 03 24912 05 24912 07	24912 11	24994 51	24994 51	24994 51
23924 43	23924 43	23924 47 pt 23924 49 pt	24212 31	24212 31	24212 22 pt 24212 23 pt 24212 25 pt	24912 09 24912 12 24912 14 24912 16	24912 09 24912 12 24912 14 24912 16	24912 13	24994 57	24994 57	24994 57
23924 46	23924 46	23924 44 pt 23924 45 pt	24212 33	24212 33	24212 22 pt	24913 09 24913 07 24913 09 24913 12 24913 14	24913 09 24913 07 24913 09 24913 12 24913 14	24913 13	24994 57	24994 57	24994 57
23924 48	23924 48	23924 47 pt 23924 49 pt	24212 35	24212 35	24212 23 pt	24913 01 24913 03	24913 01 24913 03	24913 11	24994 61	24994 61	24994 61
23924 50	23924 50	23924 42 23924 44 pt 23924 45 pt	24212 37	24212 37	24212 25 pt	24913 05 24913 07 24913 09 24913 12 24913 14	24913 05 24913 07 24913 09 24913 12 24913 14	24913 13	24994 62	24994 62	24994 62
23924 51	23924 51	23924 47 pt 23924 49 pt	24215 18 24215 22	24215 18 24215 22	24215 78 pt 24215 77 pt	24919 01 24919 03 24919 05 24919 07 24919 09	24919 01 24919 03 24919 05 24919 07 24919 09	24919 00	24994 71	24994 71	24994 71
23924 54	23924 54	23924 49 pt	24215 24	24215 24	24215 78 pt	24919 01 24919 03 24919 05 24919 07 24919 09	24919 01 24919 03 24919 05 24919 07 24919 09	24919 00	24994 71	24994 71	24994 71
23924 55	23924 55	23924 53 pt	24261 21 24261 23	24261 21 24261 23	24261 19	24931 03 24931 05	24931 03 24931 05	24931 11	24994 71	24994 71	24994 71
23924 56	23924 56	23924 52 pt 23924 53 pt	24262 24	24262 24	24262 23 24262 25	24931 07 24931 09 24931 12 24931 14	24931 07 24931 09 24931 12 24931 14	24931 13	24994 75	24994 75	24994 75
23924 91	23924 91	23924 83 23924 84	24262 86	24262 86	24262 89	24931 12 24931 14	24931 12 24931 14	24931 12	24994 75	24994 75	24994 75
23924 92	23924 92	23924 85	24266 11 24266 13	24266 11 24266 13	24266 00	24931 16 24931 18	24931 16 24931 18	24931 16	24994 79	24994 79	24994 79
23924 93	23924 93	23924 86	24290 61	24290 61	24290 63 24290 73	24931 18	24931 18	24931 18	24994 85	24994 85	24994 85
23924 95	23924 95	23924 87 23924 88	24290 83	24290 83	24290 81 24290 89	24931 19	24931 19	24931 19	24994 85	24994 85	24994 85
23930 95 23930 96	23930 95 23930 96	23930 93	24312 00	24312 00	24312 75	24931 19	24931 19	24931 19	24994 89	24994 89	24994 89
23940 61 23940 63 23940 65	23940 61 23940 63 23940 65	23940 98	24312 09	24312 09	24312 11 24312 13	24931 03 24931 05	24931 03 24931 05	24931 03	24994 91	24994 91	24994 91
23952 00	23951 12 23959 11	23951 12 23959 11 pt	24318 73 24318 77	24318 73 24318 77	24318 75	24931 16 24931 18	24931 16 24931 18	24931 16	24994 91	24994 91	24994 91
23958 11	23959 11	23951 11 pt	24353 11	24353 11	24353 01 pt 24353 03 pt	24931 18	24931 18	24931 18	24994 97	24994 97	24994 97
23958 33	23959 33	23959 33	24353 31	24353 31	24353 01 pt 24353 03 pt	24931 18	24931 18	24931 18	24994 97	24994 97	24994 97
23964 34	23951 34	23951 34	24353 98	24353 98	24353 01 pt 24353 03 pt	24931 18	24931 18	24931 18	24994 97	24994 97	24994 97
23964 37	23951 37	23951 37	24353 98	24353 98	24353 01 pt 24353 03 pt	24931 18	24931 18	24931 18	24994 97	24994 97	24994 97
23990 97 23990 99	23990 97 23990 99	23990 98	24354 27 24354 31	24354 27 24354 31	24354 29	24931 19	24931 19	24931 19	24994 97	24994 97	24994 97
24111 09	24111 09	24111 25 pt	24363 11	24363 11	24363 01 pt 24363 03 pt	24931 19	24931 19	24931 19	24994 97	24994 97	24994 97
24111 27	24111 27	24111 19 24111 25 pt	24363 31	24363 31	24363 01 pt 24363 03 pt	24931 19	24931 19	24931 19	24994 97	24994 97	24994 97
24112 23	24112 23	24112 27 pt				24931 19	24931 19	24931 19	24994 97	24994 97	24994 97
						24931 19	24931 19	24931 19	24994 97	24994 97	24994 97

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2721C 80	2721C 80	2721C 30 pt	27592 21	2751B 21	27512 11 pt 27512 15 pt 27512 16 pt 27512 18 pt 27512 23 pt	27598 21	2751H 21	27519 25	28230 39	28230 39	28230 33 pt 28230 37 pt
2721C 90	2721C 90	2721C 40 pt				27598 23	2751H 23	27519 29	28241 13	28241 13	28241 14 pt 28241 16 pt
2731E 57	2731E 57	2731E 43 2731E 55	27592 23	2751B 23	27512 33 pt	27598 25	2751H 25	27519 11	28241 19	28241 19	28241 14 pt
27416 00	27416 00	27411 13				27598 27	2751H 27	27519 81	28241 21	28241 21	28241 14 pt
27417 13	27417 13	27411 15	27592 27	2751B 27	27512 41 pt 27512 43 pt	27598 29	2751H 29	27519 85	28241 23	28241 23	28241 16 pt
27417 15 27417 17	27417 15 27417 17	27411 21	27593 12	2751C 12	27513 11	27598 31	2751H 31	27519 98	28241 25	28241 25	28241 14 pt 28241 16 pt
27418 13	27418 13	27412 13	27593 18	2751C 18	27513 17 27513 19	27599 12	27531 12	27531 12	28244 32	28244 32	28244 31 pt 28244 33 pt
27418 15	27418 15	27412 15	27594 11	2751D 11	27514 11	27599 22	27531 22	27531 22	28244 34	28244 34	28244 31 pt
27419 00	27419 00	27414 00	27594 13	2751D 13	27514 13	27599 32	27531 32	27531 32	28244 34 28244 36	28244 34 28244 36	28244 31 pt
2741A 00	2741A 00	27415 21	27594 15	2751D 15	27514 19	2759A 00	2751J 00	27510 00 pt	28244 38	28244 38	28244 33 pt
2741B 13	2741B 13	27415 11	27594 17	2751D 17	27514 25	27823 00	27823 00	27823 00 27823 43 27823 45	28244 41	28244 41	28244 31 pt 28244 33 pt
2741B 14	2741B 14	27415 31	27594 19	2751D 19	27514 27	27892 81 27892 92	27892 81 27892 92	27892 91	28244 43	28244 43	28244 35
2741B 15	2741B 15	27415 41	27595 12	2751E 12	27515 11	27910 16 27910 18	27910 16 27910 18	27910 12	28244 45	28244 45	28244 37
2741B 17	2741B 17	27415 61	27595 14	2751E 14	27515 23	27910 16 27910 18	27910 16 27910 18	27910 14	28244 47	28244 47	28244 39
2741B 19	2741B 19	27415 65	27595 16	2751E 16	27515 25	27961 13	27951 13	27951 13 35557 77 pt	28247 13	28247 13	28243 31 pt 28245 61 pt 28245 73 pt
2741B 21	2741B 21	27415 95	27595 18	2751E 18	27515 31	27961 15	27951 15	27951 15 35557 77 pt	28247 15	28247 15	28243 31 pt 28245 61 pt 28245 73 pt
2741B 23	2741B 23	27415 97	27595 20	2751E 20	27515 33	27961 17	27951 17	27951 17 35557 77 pt	28247 16	28247 16	28243 31 pt 28245 63 pt 28245 72 pt
2741B 25 2741B 27	2741B 25 2741B 27	27415 99 pt	27595 22	2751E 22	27515 41	27961 23	27951 23	27951 23 35557 77 pt	28247 19	28247 19	28243 31 pt 28245 61 pt 28245 72 pt 28245 73 pt
2741B 91	2741B 91	27415 51 27415 99 pt	27595 24	2751E 24	27515 98	27961 29	27951 29	27951 29 35557 77 pt	28247 31	28247 31	28243 33 pt 28245 66 28245 74
27522 15	27522 15	27522 11 pt 27522 13 pt	27596 13	2751F 13	27516 41	27962 31	27952 31	27952 31	28247 33	28247 33	28243 33 pt 28245 66 28245 74
27522 16	27522 16	27522 23 pt	27596 15	2751F 15	27516 51	27962 39	27952 39	27952 39	28247 35	28247 35	28243 39 28245 69 28245 79
27522 18	27522 18	27522 17 pt	27596 17	2751F 17	27516 71	27962 41	27952 41	27952 41	28248 15	28248 15	28246 15
27522 19	27522 19	27522 00	27596 19	2751F 19	27516 75	27962 45 27963 47	27952 45 27952 47	27952 65 pt	28248 81	28248 81	28246 31 28246 62 28246 71
27522 20	27522 20	27522 11 pt 27522 13 pt 27522 17 pt 27522 23 pt	27596 21	2751F 21	27516 45	27963 53	27547 00	27547 00	28333 24 28333 26	28333 24 28333 26	28333 25
27523 13	27523 13	27523 21 27523 22	27596 23	2751F 23	27516 93	27963 61	27930 15	27930 15	28351 10	2831A 21	2831A 21
27525 23	27525 23	27525 22 27525 24	27596 25	2751F 25	27516 95	27963 63	27930 17	27930 17	28351 15	2831A 22	2831A 22
27525 33	27525 33	27525 34 27525 36	27597 12	2751G 12	27511 00	27963 65	27930 21	27930 13 27930 19	28351 20	2831A 24	2831A 24
27526 11	27526 11	27526 12 27526 14	27597 14	2751G 14	27512 13 pt	27963 67	27940 00	27940 00	28351 25	2831A 25	2831A 25
27542 11	27542 11	27542 21 pt	27597 16	2751G 16	27512 17 pt	27963 71	27532 71	27532 65 pt	28351 30	2831A 26	2831A 26
27542 13	27542 13	27542 24 pt	27597 18 27597 20	2751G 18 2751G 20	27512 19 pt	27963 72 27963 73	27532 72 27532 73	27532 75	28351 35	2831A 41	2831A 27 2831A 28
27542 15	27542 15	27542 27 pt	27597 22	2751G 22	27512 13 pt 27512 17 pt 27512 19 pt	28161 11 28161 21	28161 11 28161 21	28161 00	28351 40 28351 45	2831A 42 2831A 40	2831A 29
27542 17	27542 17	27542 21 pt 27542 24 pt 27542 27 pt	27597 24	2751G 24	27512 31	28162 30 28162 40 28162 50 28162 60	28162 30 28162 40 28162 50 28162 60	28162 98	28352 10	2831A 31	2831A 31
27590 00	27510 00 pt	27510 00 pt	27597 26	2751G 26	27512 33 pt	28162 30 28162 40 28162 50 28162 60	28162 30 28162 40 28162 50 28162 60	28162 98	28352 15	2831A 51	2831A 32 2831A 33
27591 12	2751A 12	27511 15	27597 28	2751G 28	27512 41 pt	28230 34	28230 34	28230 33 pt 28230 37 pt	28352 20	2831A 61	2831A 35 2831A 36 2831A 37
27591 14	2751A 14	27511 17	27597 30	2751G 30	27512 43 pt	28230 38	28230 38	28230 33 pt 28230 37 pt	28352 25	2831A 39	2831A 39
27592 11	2751B 11	27512 11 pt	27597 32	2751G 32	27514 00						
27592 13	2751B 13	27512 15 pt	27597 34	2751G 34	27515 00						
27592 15	2751B 15	27512 23 pt	27597 36 27597 38	2751G 36 2751G 38	27516 00						
27592 17	2751B 17	27512 16 pt	27598 11 27598 13	2751H 11 2751H 13	27519 17 pt						
27592 19	2751B 19	27512 18 pt	27598 15 27598 17	2751H 15 2751H 17	27519 15						
			27598 19	2751H 19	27519 23						

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28361 15	28311 15	28311 15	28511 00— Con.	28511 00— Con.	28511 11— Con. 28511 85 28511 89 28511 93	28750 20	28750 20	28750 11 pt 28750 21 pt	29521 13— Con. 29521 15	29521 13— Con. 29521 15	29521 11— Con.
28361 20	28311 20	28311 13 28311 17 28311 19				28750 30	28750 30	28750 31 pt	29523 60	29523 60	29523 54 pt 29523 56 pt
28362 10	28312 10	28312 00	28512 00	28512 00	28512 21 28512 23 28512 25 28512 27 28512 31 28512 33 28512 35 28512 37 28512 39 28512 41	28750 40	28750 40	28750 11 pt 28750 21 pt	29523 62	29523 62	29523 53
28362 20	28312 20					28750 50	28750 50	28750 31 pt	29523 64	29523 64	29523 54 pt 29523 56 pt
28363 10	28313 10	28317 15	28513 00	28513 00	28513 01 28513 05 28513 07 28513 11 28513 13 28513 16 28513 27 28513 29 28513 31	28750 60	28750 60	28750 11 pt 28750 21 pt	29523 66	29523 66	29523 54 pt 29523 56 pt
28363 20	28313 20	28317 25				28750 70	28750 70	28750 31 pt	29990 20 29990 30	2911D 20 2911D 30	2911D 92
28364 10	28314 10	28318 14	28515 00	28515 00	28515 21 28515 22 28515 23 28515 31 28515 32 28515 99	28797 51	28797 51	28797 31 28797 81	29990 93 29990 99	29990 93 29990 99	29990 98
28364 15	28314 15					28798 30 28798 83	28798 30 28798 83	28798 81	31116 24	31116 24	31116 23 31116 25
28364 20	28314 20	28318 16	28611 98	28611 98	28611 13 28611 23 28611 99	28914 57 28914 98	28914 57 28914 98	28914 89	31116 37 31116 38	31116 37 31116 38	31116 72 pt
28364 25	28314 25					28916 10	28916 10	28915 56 pt	31116 43	31116 43	31116 41 31116 72 pt
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28412 18	28412 18	28412 05 28412 19				28916 50	28916 50	28915 67 pt	31116 63 31116 65	31116 63 31116 65	31116 64 31116 72 pt
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28423 53	28423 53	28423 99				28917 21	28917 21	28915 55	31440 00	31440 00	31445 00 31446 00 31447 00 31448 00
28441 49	28441 49	28441 37 28441 39	28691 32	2911B 32	2911B 32	28917 31	28917 31	28915 56 pt	31490 10	31490 10	31497 23
28443 25	28443 25	28443 98				28917 41	28917 41	28915 61 pt	31490 20	31490 20	31491 00 31493 00 31495 00 31496 00 31497 25
28443 27	28443 27	28443 95	28691 33	2911B 33	2911B 33	28917 51	28917 51	28915 63 pt	31510 00	31510 00	31510 20 31510 70
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28445 04	28445 04	28445 13				28995 69 28995 70 28995 71	28995 69 28995 70 28995 71	28995 68	31610 09	31610 09	31610 16 pt 31610 18 pt 31610 35 pt 31610 37 pt 31610 39 pt
28445 05	28445 05	28445 14	28744 10	28744 10	28744 21 pt 28744 31 pt	28995 82 28995 83 28995 84	28995 82 28995 83 28995 84	28995 81			
28445 08	28445 08	28445 15				28995 88 28995 89	28995 88 28995 89	28995 87			
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28445 50	28445 50	28445 45 28445 48				28995 98 28995 99	28995 98 28995 99	28995 97			
28445 59	28445 59	28445 95	28744 30	28744 30	28744 31 pt	29118 59	29118 59	29118 54 29118 58			
28445 99	28445 99					2911D 23 2911D 25	2911D 23 2911D 25	2911D 21			
28511 00	28511 00	28511 11 28511 21 28511 22 28511 24 28511 25 28511 35 28511 37 28511 38 28511 43 28511 45 28511 47 28511 49 28511 53 28511 57 28511 59 28511 63 28511 65 28511 69 28511 71 28511 73 28511 75 28511 77 28511 81 28511 83	28750 10	28750 10	28750 21 pt 28750 31 pt	29521 13	29521 13	29521 11			

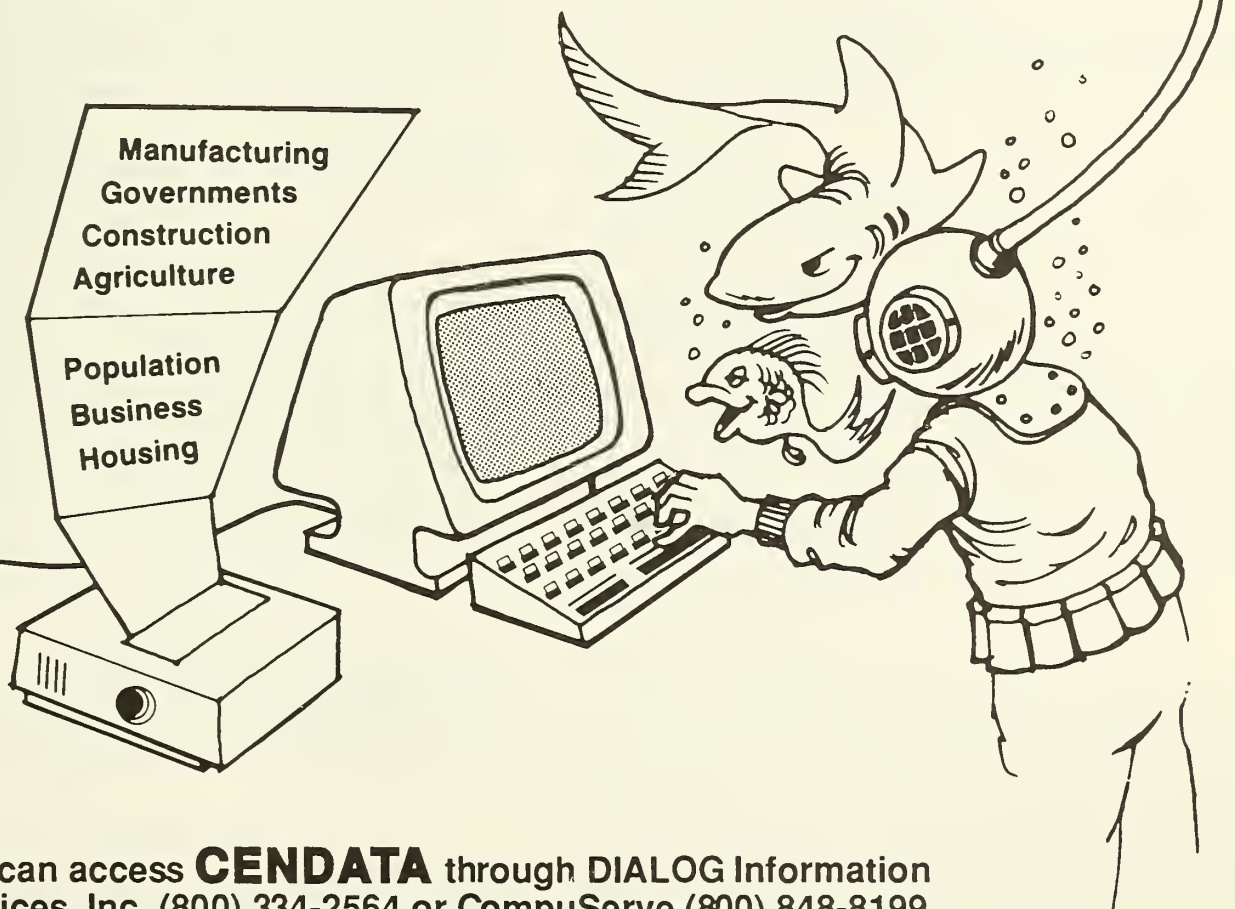


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PUBLICATION PROGRAM

1987 CENSUS OF MANUFACTURES

Publications of the 1987 Census of Manufactures, containing preliminary and final data on manufacturing establishments in the United States, are described below. Publications order forms for the specific reports may be obtained from any Department of Commerce district office or from Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, DC 20233.

Preliminary Reports

Industry series—83 reports (MC87-I-20A(P) to -39D(P))

Preliminary industry data are issued in 83 separate reports covering 459 industries. Preliminary summary data for the U.S. and States are released in one report.

Final Reports

Industry series—83 reports (MC87-1-20A to -39D)

Each of the 83 reports provides information for a group of related industries ("dairy products" includes industries for butter, cheese, milk, etc.). Final figures for the United States are shown for each of the 459 manufacturing industries on quantity and value of products shipped and materials consumed, cost of fuels and electric energy, capital expenditures, assets, rents, inventories, employment, payroll, payroll supplements, hours worked, value added by manufacture, number of establishments, and number of companies. Comparative statistics for earlier years are provided where available.

For each industry, data on value of shipments, value added by manufacture, capital expenditures, employment, and payroll are shown by employment-size class of establishment, State, and degree of primary product specialization.

Geographic area series—51 reports (MC87-A-1 to -51)

A separate report is being published for each State and the District of Columbia. Each report presents data for industry groups and industries on value of shipments, cost of materials, value added by manufacture, employment, payroll, hours worked, new capital expenditures, and number of manufacturing establishments for the State, MSA's, counties, and selected places. Comparative statistics for earlier census years are shown for the State and large MSA's. Manufacturing totals are presented for each county and for places with significant manufacturing activity. Detailed statistics (including inventories, assets, rents, and energy costs) are presented only in statewide totals.

Subject series—7 reports (MC87-S-1 to -7)

Each of the seven reports contains detailed statistics for an individual subject, such as concentration ratios in manufacturing, type of organization, water use in manufacturing, textile machinery in place, distribution of sales by class of customer, manufacturers' shipments to the Federal Government, and a general national-level summary.

Reference series—1 report (MC87-R-1)

The Numerical List of Manufactured and Mineral Products includes a description of the principal products and services published in the 1987 Censuses of Manufactures and Mineral Industries.

Location of Manufacturing Plants—1 report (MC87-LM)

This report includes data for number of establishments by four-digit SIC industry and by employment-size class for counties, incorporated places of 2,500 inhabitants or more, and zip codes for each State. (This report is available only on magnetic tape and CD-ROM.)

Analytical Reports—3 reports (AR87-1 to -3)

Exports From Manufacturing Establishments (AR87-1)

This report presents data on exports by two- and three-digit SIC industry groups for the United States and States. Information is presented on value of direct report shipments and estimates of the employment required to manufacture these products. Included are estimates of employment in manufacturing and nonmanufacturing establishments that supply parts, materials, and services for production of manufactured exports.

Selected Characteristics of Manufacturing Establishments That Export (AR87-2)

This report presents data on the number of manufacturing companies and establishments that export by major group, State, employment size, and ratios of exports to shipments.

Indexes of Production (AR87-3)

The indexes presented in this report are designed to measure the change in physical output of each manufacturing and mineral industry between 1982 and 1987.

MICROFICHE

Every final published report in the 1987 Census of Manufactures will be available on microfiche.

PUBLIC-USE COMPUTER TAPES AND COMPACT DISCS

Data from the final industry series, geographic area series, and the Location of Manufacturing Plants report will be available on public-use computer tapes and compact discs-read only memory (CD-ROM). These tapes will provide the same information found in the final reports. Computerized data products are available for users who wish to summarize, rearrange, or process large amounts of data. These products, with corresponding technical documentation, are sold by Data User Services Division, Customer Services (Tapes), Bureau of the Census, Washington, DC 20233.

OTHER ECONOMIC CENSUSES REPORTS

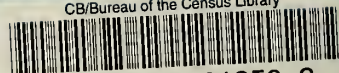
Data on retail trade, wholesale trade, service industries, construction industries, mineral industries, transportation, enterprise statistics, minority-owned businesses, and women-owned businesses also are available from the 1987 Economic Censuses. A separate series of reports covers the censuses of outlying areas—Puerto Rico, Virgin Islands of the United States, Guam, and the Northern Mariana Islands. Separate announcements describing these reports are available free of charge from Data User Services Division, Customer Services (Publications), Bureau of the Census, Washington, DC 20233.



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